

Editorial: Evidence-Based Guidelines for Avoiding the Most Prevalent and Serious APA Error in Journal Article Submissions—The Citation Error

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In a previous editorial, Onwuegbuzie, Combs, Slate, and Frels (2010) discussed the findings of Combs, Onwuegbuzie, and Frels (2010), who identified the 60 most common American Psychological Association (APA) errors—with the most common error being incorrect use of numbers that was committed by 57.3% of authors. However, they did not analyze citation errors, which stem from a failure “to make certain that each source referenced appears in both places [text and reference list] and that the text citation and reference list entry are identical in spelling of author names and year” (APA, 2010, p. 174). Thus, in this editorial, we provide evidence-based guidelines to help authors avoid committing citation errors. Specifically, we present the results of a mixed analysis of 150 manuscripts submitted to Research in the Schools over a 7-year period, which revealed that citation errors were committed by 91.8% of the authors. Thus, citation errors represent the most pervasive APA error. Articles with more citation errors were statistically and practically ($d = 0.45$) significantly less likely to be accepted for publication. Disturbingly, citation errors represent the most serious of errors because unlike the other 60 APA errors, they cannot be rectified directly by copyeditors. We document that citation errors are a widespread problem. Thus, we caution authors to make every effort to avoid citation errors when compiling reference lists. Also, we urge that writers of future APA Publication Manuals devote much more than one paragraph—as was the case in the sixth edition—to discussing this issue.

In a previous editorial, Onwuegbuzie, Combs, Slate, and Frels (2010) discussed the findings of Combs, Onwuegbuzie, and Frels (2010), who identified the 60 most common American Psychological Association (APA) errors among authors who submitted manuscripts to *Research in the Schools* over a 6-year period. This editorial led to representatives of APA inviting us to write a blog post (<http://blog.apastyle.org/apastyle/#tp>), which also was included on APA's facebook (<http://www.facebook.com/#!/APAStyle>) and Twitter (http://twitter.com/APA_Style) accounts. According to these APA representatives, our editorial will motivate 60 sets of discussion posts (already several posts have been made; see, for e.g., <http://blog.apastyle.org/apastyle/2011/01/numbers->

[anyone.html](http://blog.apastyle.org/apastyle/2011/01/numbers-anyone.html))—one for each of the 60 most common APA errors that we found, which will involve at least 135,000 users from 177 countries.

Of the 60 APA errors that were identified, the most prevalent error was the incorrect use of numbers, which was committed by 57.3% of the authors. As noted by Onwuegbuzie et al. (2010), this prevalence rate represents an extremely large effect size. However, it should be noted that there was one APA error that Combs et al. did not examine, namely, that pertaining to citing references in text and presenting references in the reference list. This APA error was omitted deliberately by Combs et al. because, as we will demonstrate, this error represents the most serious APA error and thus deserves sole examination.

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Citing References in Text

As declared in the seminal article developed by the Task Force on Reporting of Research Methods in American Educational Research Association (AERA) Publications and adopted by the AERA Council in

2006, authors should pay special attention to reporting criteria as presented in the document “Standards for Reporting on Empirical Social Science Research in AERA Publications” (AERA, 2006). In this article, guidelines are provided that apply to reports of educational research grounded in the empirical traditions of the social and behavioral sciences. Specifically, these standards stem from two overarching principles:

First, reports of empirical research should be *warranted*; that is, adequate evidence should be provided to justify the results and conclusions. Second, reports of empirical research should be *transparent*; that is, reporting should make explicit the logic of inquiry and activities that led from the development of the initial interest, topic, problem, or research question; through the definition, collection, and analysis of data or empirical evidence; to the articulated outcomes of the study. Reporting that takes these principles into account permits scholars to understand one another’s work, prepares that work for public scrutiny, and enables others to use that work. These standards are therefore intended to promote empirical research reporting that is warranted and transparent. (AERA Task Force on Reporting of Research Methods in AERA Publications, 2006, p. 33)

Indubitably, the most appropriate way to promote empirical research reporting that is both warranted and transparent is by including references (i.e., citations) in articles. Indeed, the referencing or citing of relevant works is justified not only in empirical research reports representing qualitative, quantitative, and mixed research but also in non-empirical articles, including literature reviews, theory-oriented papers, and case studies. And, the importance of providing warranted and transparent empirical research reports in general and referencing relevant works in particular is not unique to educational research. As such, the overwhelming majority of articles published in peer-reviewed journals representing social, behavioral, and health-related fields contain one or more references.

As noted by Waytowich, Onwuegbuzie, and Jiao (2006), a fundamental goal of a referenced work is to establish a link between the citing and cited document. Kochen (1987) described the association of concepts, theories, or ideas as representing formal acknowledgements of *intellectual debt* to earlier sources of information. Further, the reference list yields a literature history of relevant studies that make up the body of knowledge via citations. Other goals of citations include (a) providing the reader with retrieval information, assisting document retrieval; (b) authenticating data; (c) meeting social needs, such as citing work by authors to increase

their visibility; (d) providing access to background information pertaining to the topic of interest; (e) providing a resource for readers to find additional literature on the topic; and (f) helping readers to follow up a cited reference to increase their knowledge of existing research, to locate other related material, or to provide credibility and support for the assertions and claims made by the authors (Hernon & Metoyer-Duran, 1992; Pandit, 1993; Sweetland, 1989; Waytowich et al., 2006; Wyles, 2004).

According to the writers of APA (2010),

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 citations ensure that references are accurate, complete, and useful to investigators and readers. (p. 37)

The authors of APA (2010) further state the following:

References in APA publications are cited in text with an author-date citation system and are listed alphabetically in the reference list. This style of citation briefly identifies the source for readers and enables them to locate the source of information in the alphabetical reference list at the end of the article. Each reference cited in text must appear in the reference list, and each entry in the reference list must be cited in the text. Make certain that each source referenced appears in both places and that the text citation and reference list entry are identical in spelling of author names and year. (p. 174)

Thus, any reference cited either in the text or in the reference list that does not conform to this stipulation represents a citation error, or what is also known as a bibliographic error (see, for e.g., Jiao, Onwuegbuzie, & Waytowich, 2008; Onwuegbuzie, Waytowich, & Jiao, 2006). Although not considered as such by some—if not many—authors, a citation error represents an APA error. Moreover, a citation error represents the most serious APA error because, although copyeditors can correct the other types of APA errors themselves, including all 60 APA errors identified by Onwuegbuzie et al. (2010), they cannot correct citation errors without consulting the author(s) of the manuscript—thereby possibly delaying publication of the article or even the issue

that contains the article. For example, if a name is spelled differently in the text (e.g., “Frels”) from how it is spelled in the reference list (e.g., “Freils”), the copyeditor likely cannot be 100% certain about which spelling is correct and thus would have to ask the author. This citation error becomes even more problematic if the name is spelled consistently but incorrectly in both the text and reference list, in which case, the copyeditor might not even query the citation error with the author.

Significance of Citation Errors

Unfortunately, citation errors have been identified for more than 100 years (Sweetland, 1989), with the classic example of the citation error being the 1887 Czech article written by Jaroslav Hlava, entitled “O uplavici,” which means “on dysentery” (Sassen, 1992). Mistakenly, a German abstract that was later published contained the author’s name as O. Uplavici, which began 50 years of miscitations, only being discovered as a citation error in 1938 as a result of research conducted by Clifford Dobell (Sweetland, 1989). As such, citation errors not only adversely affect both the trustworthiness of the cited literature and the validity of the primary research findings, they also raise doubts about the credibility and integrity of the author (Faunce & Job, 2001; Hernon & Metoyer-Duran, 1992; Spivey & Wilks, 2004). Thus, the citation error represents an APA error that has the most ethical implications.

After extensively reviewing articles wherein the prevalence rate of citation errors was investigated (e.g., de Lacey, Record, & Wade, 1985; Gosling, Cameron, & Gibbons, 2004; Ngan Kee, Roach, & Lau, 1997; Nishina, Asano, Mikawa, Maekawa, & Obara, 1995; Roach, Lau, & Ngan Kee, 1997; Siebers, 2000; Siebers & Holt, 2000), Onwuegbuzie et al. (2006) documented a “high rate of errors ranging from 8% to 66.7%, with as many as 6% of the original articles being irretrievable” (§ 2). Since the publication of Onwuegbuzie et al.’s (2006) article, Raja and Cooper (2006) reported a citation error rate of 19% among manuscripts submitted to the *Emergency Medical Journal*. Even prevalence rates at the low end of the range (i.e., 8%) are practically significant. Moreover, these rates also have what Leech and Onwuegbuzie (2004) refer to as *economic significance*. For instance, with respect to interlibrary loan requests, an incorrect citation might cost as much as \$72.90 in 2001 dollars (Pedersen, 2001).

The fact that citation error rates can be as high as 66.7% in published articles is extremely disturbing, especially bearing in mind that these articles presumably have undergone some form of (professional) copyediting process. Indeed, this citation error rate—which represents an APA error

rate—is significantly higher than even the highest APA error prevalence rate (i.e., 57.3%) identified by Onwuegbuzie et al. (2010). As high as this rate is, it is likely that manuscripts that are submitted to journals that have not yet been professionally copyedited in general and manuscripts that end up being rejected in particular have even higher citation error rates. However, an extensive review of the literature revealed only one published study (i.e., Onwuegbuzie et al., 2006) wherein the citation error rates of *unpublished* manuscripts—that is, manuscripts submitted to journals for review for publication—were examined. Specifically, Onwuegbuzie et al. (2006) examined 52 manuscripts submitted to *Research in the Schools* over a 2-year period, which represented more than 50% of all manuscripts submitted to this journal over this period. These researchers discovered a mean number of citation errors among manuscripts submitted to *Research in the Schools* of 5.87, which translated to a citation error rate of 28.6%, indicating that for every three to four citations made (i.e., $100/28.6 = 3.49$) in manuscripts submitted to *Research in the Schools*, on average, one of them represented some type of citation error. Further, Onwuegbuzie et al. reported a statistically significant and practically significant (i.e., moderate) relationship between the number of citation errors and the decision made by the co-editors of the journal, with authors who made more than three citation errors being approximately four times more likely (odds ratio = 4.01; 95% confidence interval = 1.22, 13.17) to have their manuscripts rejected than were authors who made three or less citation errors. Unfortunately, these researchers did not report the proportion of authors who made one or more citation errors. To this end, in this editorial, we replicate and extend the work of Onwuegbuzie et al. (2006). In addition, we provide evidence-based guidelines to help authors avoid committing citation errors.

Sources of Evidence

We conducted a mixed research study in which we examined 150 manuscripts submitted to *Research in the Schools* over a 7-year period. These manuscripts represented approximately 60% of all manuscripts submitted to this journal over this period, which made our findings generalizable to the population of manuscripts submitted to *Research in the Schools*—at least over this period of time. This 7-year period represented the years 2003 to 2010. We deemed the year 2003 as being an appropriate starting point because, as surmised by Onwuegbuzie et al. (2010), it represented 2 years after the fifth edition of the *Publication Manual* was introduced—a sufficient time for all users of the fourth edition to become familiar with the fifth edition of the

Publication Manual of APA. Further, we considered 2010 to be an appropriate end point because it represents the last year of the fifth edition and the introduction of the sixth edition.

We meticulously documented every citation error committed by these 150 sets of authors over the 7-year period. Alongside collecting citation error information, we collected an array of information associated with each of these manuscripts, including the following: the topic of the manuscript, genre of the manuscript, number of authors per manuscript, gender of the primary author, the geographical location of the primary author's affiliation (i.e., states of residence and university affiliations), and the Carnegie Classification (The Carnegie Foundation for the Advancement of Teaching, n.d.) adopted by the higher education research community to describe each primary author's academic institution. In addition, we documented every APA error that appeared in these 150 manuscripts. Therefore, our data set is even more extensive than that of Combs et al. (2010). Our data set also is unique because only journal editors have the opportunity to collect these data. Moreover, because of its extensive nature, it is extremely unlikely that any other editor has compiled such data.

Methodology

Being *dialectic pragmatists* (i.e., our philosophical stance was a belief in incorporating multiple epistemological perspectives within the same inquiry; Johnson, 2009; Johnson & Gray, 2010), we utilized mixed analysis techniques—specifically, a sequential mixed analysis (Onwuegbuzie & Combs, 2010)—to investigate the role of citation errors in the 150 manuscripts. Specifically, we used an eight-stage sequential mixed analysis procedure wherein the first stage involved a constant comparison analysis (Glaser & Strauss, 1967) of the 150 manuscripts to determine the number of general ways (i.e., themes) that citation errors can occur. These themes were extracted a posteriori (Constas, 1992) using the rules specified in the sixth edition of the *Publication Manual*. The second stage involved an a priori classical content analysis (Berelson, 1952; see also Leech & Onwuegbuzie, 2007, 2008, 2011) of the 150 coded manuscripts to determine the frequency of each of the citation error themes extracted in the first stage. The third stage involved using Geographic Information Systems (GIS) techniques (J. G. Frels, Frels, & Onwuegbuzie, 2010, 2011) to provide a spatial representation of the citation error rates. Specifically, the citation error rates were displayed on a map of the United States to facilitate the identification of any regional patterns. The fourth stage involved

converting the citation error themes that were extracted in the first stage to numerical codes, a technique known as quantizing (Miles & Huberman, 1994; Tashakkori & Teddlie, 1998). Specifically, the themes were converted to numeric data by assigning a “1” if the manuscript contained one or more citation errors and a “0” if the manuscript did not contain any citation errors that were classified under that theme (Onwuegbuzie, 2003; Onwuegbuzie & Teddlie, 2003). This dichotomization (i.e., binarization) led to the creation of an “inter-respondent matrix” (i.e., *manuscript x theme matrix*) that comprised a combination of 0s and 1s (Onwuegbuzie, 2003, p. 396).

The inter-respondent matrix, indicating which manuscripts contributed to each emergent citation error theme, was used to conduct a principal component analysis to determine the underlying structure of the citation error themes. This inter-respondent matrix was transformed to a matrix of bivariate associations that represented tetrachoric correlation coefficients because the citation error themes had been quantized to dichotomous data (i.e., “0” vs. “1”). Tetrachoric correlation coefficients are appropriate to use when examining the association between two (artificial) dichotomous variables (cf. Onwuegbuzie et al., 2007). Thus, the matrix of tetrachoric correlation coefficients was the basis of the principal component analysis. An orthogonal (i.e., varimax) rotation was employed, combining use of the eigenvalue-greater-than-one rule (i.e., K1; Kaiser, 1958) and the *scree* test (representing a plot of eigenvalues against the factors in descending order; Cattell, 1966; Zwick & Velicer, 1986), to determine an appropriate number of factors to retain (cf. Kieffer, 1999). These factors represented *meta-themes* (Onwuegbuzie, 2003) wherein each meta-theme contained one or more of the citation error themes. As recommended by Onwuegbuzie (2003), the *trace*, or proportion of variance explained by each factor after rotation, represented an effect size index for each meta-theme. By determining the hierarchical relationship among the themes, the verification component of categorization was empirical, technical, and rational (Constas, 1992).

In the fifth stage, a latent class analysis was used to determine the number of clusters (i.e., latent classes) underlying the citation error themes. In the sixth stage, the inter-respondent matrix was utilized to examine the relationship between the citation error themes and an array of variables. In particular, we conducted (a) a series of chi-square analyses to determine whether genre of manuscript (i.e., quantitative vs. qualitative vs. mixed) was related to citation error rate; (b) a canonical discriminant analysis to determine which of the citation error

themes best predicted the decision that the editor made on the manuscript (i.e., reject, revise and resubmit, or accept); and (c) an independent samples *t* test to compare manuscripts that were accepted to manuscripts that were not accepted (i.e., revise and resubmit, or reject) with respect to the total number of citation errors. The seventh stage involved the use of classical content analysis to determine the prevalence rate of the 60 most common APA errors and the 14 APA error themes that were identified by Combs et al. (2010). As such, these themes were extracted a priori (Constas, 1992). The eighth and final stage involved using the inter-respondent matrix pertaining to the citation error codes and the inter-respondent matrix corresponding to the 14 APA error themes to conduct a canonical correlation analysis in which the multivariate relationship between the citation error themes and the APA error themes was examined. In addition, a canonical correlation analysis was utilized to investigate the multivariate relationship between the citation error themes and selected demographic variables (e.g., number of authors, length of manuscript).

Findings

Stage 1 Findings

The constant comparison analysis led to the identification of five citation error themes that characterized five broad types of citation errors: (a) Not in Reference List, (b) Not Consistent with Reference List, (c) Not in Text, (d) Incomplete or Incorrect Citation, and (e) Incomplete or Incorrect Reference. For the purpose of the naming of our themes, *citations* refer to in-text citations and *references* pertain to works presented in the reference list. These five citation error themes are described in Table 1. Once these five themes had been identified, the 150 manuscripts then were re-analyzed (i.e., recoded) to determine the prevalence rate of each of these five themes. That is, the five themes were quantitized (Miles & Huberman, 1994; Sandelowski, Voils, & Knafl, 2009; Tashakori & Teddlie, 1998).

Stage 2 Findings

The classical content analysis revealed a total of 940 citation errors across the 150 manuscripts, yielding more than 6 citation errors per manuscript, on average ($M = 6.26$, $SD = 7.09$). This mean number of citation errors is extremely high. Onwuegbuzie et al. (2006) reported that the number of works included on each reference list of each the 52 manuscripts ranged from 8 to 60 ($M = 31.10$, $SD = 15.68$). Projecting this mean number of works cited in Onwuegbuzie et al.'s study to the current study yields an estimated citation error rate of 20.13% (i.e., $6.26/31.10$). This citation error rate indicates that for

every five citations included, on average, one of them represented some type of citation error.

The number of citation errors ranged from 0 to 48. Disturbingly, only 8.2% of the manuscripts did not contain any citation errors, implying that 91.8% of the manuscripts contained one or more citation errors. Further, nearly one in five manuscripts (19.1%) contained at least 10 citation errors, 11.6% contained at least 15 citation errors, and 4.8% contained 20 or more citation errors. The mean citation error rate is higher than that reported by Onwuegbuzie et al. (2006); however, this difference is not statistically significant ($t[200] = 0.33$, $p = .37$, Cohen's [1988] $d = 0.05$).

Table 1 also presents the mean, standard deviation, and range regarding the number of citation errors pertaining to each of the five citation error themes. It can be seen that authors committing citation errors associated with in-text citations not being presented in the reference list (i.e., Not in Reference List) and citation errors associated with citations in the text and the reference list not being consistent (i.e., Not Consistent with Reference List) were almost equally the most prevalent, followed by citation errors associated with references that are not cited in the text (i.e., Not in Text). Interestingly, after using the Bonferroni adjustment to control for the inflation of Type I error (e.g., Chandler, 1995; Ho, 2006; Manly, 2004; Vogt, 2005), seven of the 10 pairwise comparisons (i.e., dependent samples *t* test) were statistically significant (i.e., $p < .005$). Specifically, Not in Reference List errors were statistically significantly more prevalent than were Incomplete or Incorrect Citation errors ($d = 0.77$) and Incomplete or Incorrect Reference errors ($d = 0.44$). Further, Not Consistent with Reference List errors were statistically significantly more prevalent than were Incomplete or Incorrect Citation errors ($d = 1.31$) and Incomplete or Incorrect Reference errors ($d = 0.65$). Also, Not in Text errors were statistically significantly more prevalent than were Incomplete or Incorrect Citation errors ($d = 0.71$) and Incomplete or Incorrect Reference errors ($d = 0.32$). Finally, Incomplete or Incorrect Reference errors were statistically significantly more prevalent than were Incomplete or Incorrect Citation errors ($d = 0.36$). In summary, most notably, Not in Reference List errors and Not Consistent with Reference List errors were statistically and practically significantly (i.e., moderately to largely) more prevalent than were Incomplete or Incorrect Citation errors and Incomplete or Incorrect Reference errors.

A series (i.e., $n = 10$) of nonparametric (i.e., Spearman) correlations, after applying the Bonferroni adjustment to control for the inflation of Type I error, revealed three statistically significant findings. Specifically, authors who committed Not in

Reference List errors were statistically significantly and moderately more likely also to commit Not Consistent with Reference List errors ($r[148] = .28, p < .001$) and Not in Text errors ($r[148] = .39, p <$

$.001$). Also, authors who committed Not Consistent with Reference List were statistically significantly and moderately more likely also to commit Not in Text errors ($r[148] = .31, p < .001$).

Table 1

Stage 1 and 2 Findings: Themes, Frequencies, Formulated Meanings, and Selected Examples of Citation Errors

Citation Error Theme	Mean (and Standard Deviation, Range) Number of Citation Errors per manuscript	Formulated Meaning	Selected Example(s)
Not in Reference List	2.06 (4.04, 0-30)	Work that is cited in text but does not appear in the reference list	<i>Frels (2010)</i> cited in the text but not presented in the reference list
Not Consistent with Reference List	2.05 (1.99, 0-11)	Work that appears in the text that is not consistent with the corresponding work that is presented in the reference list	inconsistent spelling of one or more of the authors (e.g., <i>Frels [2010]</i> cited in the text but <i>Freils [2010]</i> cited in the reference list) inconsistent date (e.g., <i>Frels [2010]</i> cited in the text but <i>Frels [2009]</i> cited in the reference list)
Not in Text	1.49 (2.79, 0-18)	Work that is cited in the reference list but that does not appear in the text	<i>Frels (2010)</i> presented in the reference list but not cited in the text
Incomplete or Incorrect Citation	0.19 (0.85, 0-9)	Work that appears in the text that is incomplete or inaccurate	year of publication omitted name of one or more authors mis-spelled incorrect title incorrect publication year the editor(s) of an edited book cited (e.g., Tashakkori & Teddlie, 2010) instead of the author(s) of the relevant chapter(s) within the edited book
Incomplete or Incorrect Reference	0.72 (2.08, 0-17)	Work that appears in the reference list that is incomplete or inaccurate	page numbers omitted title omitted source omitted (e.g., website; journal name; volume number; publisher name; city, state, and/or country of publisher) incorrect page numbers incorrect title incorrect source (e.g., website; journal name; volume number; publisher name; city, state, and/or country of publisher)

Stage 3 Findings

Figure 1 illustrates the results of the citation errors rates that were subjected to GIS applications. This figure depicts the citation error rates displayed on a map of the United States. It can be seen from this map that the various clusters of highest citation error averages (9-23 per manuscript) cover states throughout the United States, including the mid-

southern states of Alabama, Tennessee, and Kentucky and the northeastern states of New York, Pennsylvania, Virginia, North Carolina, and South Carolina. Notwithstanding, every region of the US includes manuscripts with some level of citation error.

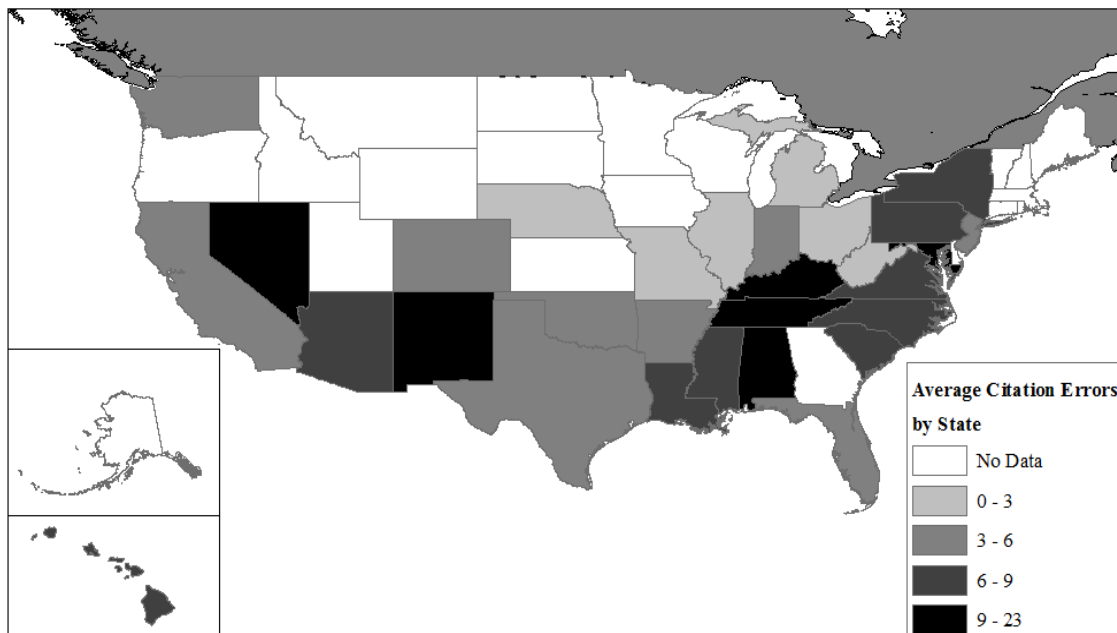


Figure 1. Stage 3 Findings: States of residence of lead authors submitting manuscripts to *Research in the Schools* and the average citation errors committed.

Stage 4 Findings

A principal component analysis was used to determine the number of factors underlying the five citation error themes. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was greater than .5 (i.e., KMO = .52) and Bartlett's test of sphericity was statistically significant ($X^2[10] = 52.84, p < .0001$), thereby justifying the principal component analysis. The eigenvalue-greater-than-one rule (i.e., K1; Kaiser, 1958) resulted in two factors (i.e., meta-themes) being retained. The *scree* test also suggested that two factors be retained. This two-factor solution is presented in Table 2. Using a cutoff correlation of 0.3, recommended by Lambert and Durand (1975) as an acceptable minimum value for

pattern/structure coefficients, Table 2 reveals that the following citation error themes had pattern/structure coefficients with large effect sizes on the first factor: Not in Reference List, Not Consistent with Reference List, and Not in Text; and the following citation error themes had pattern/structure coefficients with large effect sizes on the second factor: Incomplete or Incorrect Citation and Incomplete or Incorrect Reference. The first meta-theme (i.e., Factor 1) was labeled *Missing or Inconsistent Citations/References*. The second meta-theme (i.e., Factor 2) was termed *Erroneous Citations/References*.

Table 2

Stage 4: Summary of Themes and Factor Pattern/Structure Coefficients from Principal Component Analysis (Varimax): Two-Factor Solution

Theme	Factor Coefficients ¹		Communality Coefficient
	1	2	
Not in Reference List	.74	-.11	.56
Not in Text	.71	.06	.51
Not Consistent with Reference List	.57	.21	.37
Incomplete or Incorrect Citation	.01	.78	.61
Incomplete or Incorrect Reference	.09	.74	.56
Trace	1.49	1.12	2.61
% variance explained	29.69	22.31	51.99

The *trace* (i.e., the proportion of variance explained, or eigenvalue, after rotation; Hetzel, 1996) revealed that the *Missing or Inconsistent Citations/References* meta-theme (i.e., Factor 1) explained 29.69% of the total variance and the *Erroneous Citations/References* meta-theme (i.e., Factor 2) accounted for 22.31% of the variance. These two meta-themes combined explained 51.99% of the total variance. Interestingly, this proportion of total variance explained is greater than that typically explained in factor solutions (Henson, Capraro, & Capraro, 2004; Henson & Roberts, 2006). Moreover, this total proportion of variance (i.e., latent effect size index) can be considered as representing a large effect size. The manifest effect size (i.e., actual error rate per meta-theme) associated with the two meta-themes was as follows: *Missing or Inconsistent Citations/References* (89.7%) and *Erroneous Citations/References* (32.2%). The thematic structure, including the latent effect sizes and manifest effect sizes, is presented in Figure 2. This crossover visual representation (i.e., integrating both quantitative and qualitative results within the same display; Onwuegbuzie & Dickinson, 2008) illustrates the relationships among the themes and meta-themes arising pertaining to citation errors.

Stage 5 Findings

A latent class analysis was conducted to obtain the smallest number of clusters that accounts for all the associations among the citation error themes. The assumption behind latent class analysis is that a certain number of distinct citation error themes exists, and that manuscripts can be sub-divided into a small number of unique clusters known as latent classes based on their profiles of citation errors, with

each manuscript belonging to only one cluster. Thus, the latent class analysis represented qualitizing of the data (i.e., converting numeric data into [qualitative] narrative profiles; Tashakkori & Teddlie, 1998).

The latent class analysis on the five citation error themes suggested that the optimal number of clusters was two ($L^2 = 21.46$, $df = 20$, $p = .37$, Bootstrap $p = .33$). Figure 3 displays these two distinct groups of manuscripts. In particular, it can be seen from Figure 3 that Cluster 1 (comprising 54.3% of manuscripts) is relatively high with respect to three of the citation error themes (i.e., Not in Reference List errors, Not Consistent with Reference List errors, Not in Text errors). In contrast, Cluster 2 (comprising 45.7% of manuscripts) is moderately high on Not in Reference List errors and Not Consistent with Reference List errors and low on the remaining three citation error themes. Interestingly, the profiles are very similar in shape except that Cluster 1 represents authors with higher prevalence rates of citation errors across all five citation error themes. As can be seen from Figure 3, Not in Reference List errors (Wald = 5.76, $p = .016$, $R^2 = 13.88\%$), Not Consistent with Reference List errors (Wald = 5.52, $p = .019$, $R^2 = 14.02\%$), and Not in Text errors (Wald = 7.35, $p = .007$, $R^2 = 24.20\%$) statistically significantly discriminated the two clusters, whereas Incomplete or Incorrect Citation errors (Wald = 1.58, $p = .21$, $R^2 = 4.55\%$) and Incomplete or Incorrect Reference errors (Wald = 2.28, $p = .13$, $R^2 = 5.48\%$) did not. Examining the R^2 values indicates that Not in text errors had the most variance explained by the 2-cluster model.

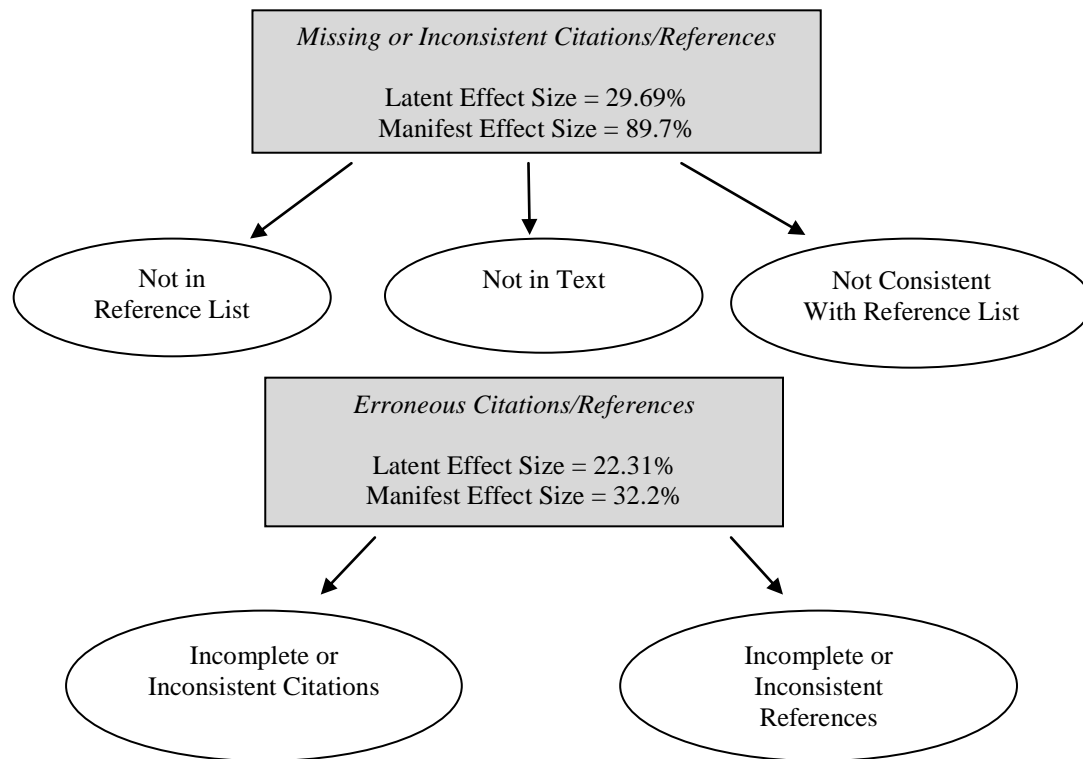


Figure 2. Stage 4 Findings: Crossover visual representation: Thematic structure pertaining to citation errors.

Stage 6 Findings

With regard to the genre of a manuscript, slightly more than one half of the manuscripts (54.1%) represented quantitative empirical research studies, 17.8% represented qualitative empirical research studies, 17.1% represented mixed research studies, and 11.0% represented non-empirical manuscripts (e.g., conceptual, theoretical, or methodological, or review of literature). Chi-square analysis techniques were used to examine the relationship between the genre of the manuscript and the number of citation errors. Specifically, a statistically significant relationship emerged between the genre of the manuscript and the number of citation errors (i.e., 0-3 citation errors vs. > 3 citation errors), $\chi^2(3) = 8.86$, $p = .031$, with a small-to-moderate effect size (Cramer's $V = .25$). Interestingly, the highest proportion of manuscripts with 4 or more citation errors were represented by qualitative research (76.9%), followed by mixed research (64.0%), quantitative research (49.4%), and non-empirical manuscripts (37.5%), respectively.

The genre of the manuscript also was correlated with the number of citation errors via a canonical discriminant analysis to determine which of the five

citation error themes best predicted the genre of the manuscript. This analysis revealed three statistically significant canonical functions. The first canonical function ($R_c = .29$; $\chi^2[15] = 27.42$, $p = .025$) had a large squared canonical correlation coefficient of 29.1%, and indicated that the following three citation error themes played an important role in predicting the genre of the manuscript: Not Consistent with Reference List (standardized canonical discriminant coefficient = $-.86$, structure coefficient = $-.75$), Incomplete or Incorrect Citation (standardized canonical discriminant coefficient = $.47$, structure coefficient = $.45$), and Incomplete or Incorrect Reference (standardized canonical discriminant coefficient = $.47$, structure coefficient = $.30$). These citation error themes maximally separated quantitative (group centroid = $-.14$) and qualitative (group centroid = $-.28$) manuscripts from mixed research (group centroid = $.37$) and non-empirical (group centroid = $.58$) manuscripts, with manuscripts containing citation errors associated with Incomplete or Incorrect Citations or Incomplete or Incorrect References being much more likely to represent mixed research or to be non-empirical in genre. In contrast, authors of manuscripts representing quantitative or qualitative research were much more

likely to commit citation errors associated with Not Consistent with Reference.

A second canonical discriminant analysis was utilized to determine which of the five citation error themes predicted whether the editor's decision for a manuscript was reject, revise and resubmit, or accept (i.e., manuscript disposition). This analysis revealed two statistically significant canonical functions. The second canonical function was neither statistically significant nor practically significant ($R_c = .11$; $\chi^2[4] = 1.57$, $p = .81$) and thus the corresponding standardized canonical discriminant function coefficients and standardized canonical discriminant function coefficients were not interpreted. However, the first canonical function ($R_c = .26$; $\chi^2[10] = 18.33$, $p = .049$) was statistically significant with a small-to-moderate squared canonical correlation coefficient of 6.81%, and indicated that the following two citation error themes played an important role in predicting the editor's decision: Not in Reference List (standardized canonical discriminant coefficient = .57, structure coefficient = .57) and Incomplete or Incorrect Citation (standardized canonical discriminant coefficient = .82, structure coefficient = .82). These citation error themes maximally separated manuscripts that were accepted for publication (group centroid = .71) and manuscripts that received a revise and resubmit decision (group centroid = .04) from manuscripts that were rejected (group centroid = -.13), with authors who committed citation errors associated with Not in Reference List or Incomplete or Incorrect Citations being much more likely to be rejected.

Further, an independent samples *t* test revealed that manuscripts that were accepted ($M = 3.62$, $SD = 3.56$) contained statistically significantly ($t[33.76] = -2.88$, $p = .007$) less citation errors than did manuscripts that were not accepted (i.e., revise and resubmit, or reject) ($M = 6.78$, $SD = 7.34$). The effect size associated with this difference was medium at 0.45 (Cohen, 1988).

Stage 7 and 8 Findings

After the 150 manuscripts had been qualitatively coded using the 14 APA error themes that were identified by Combs et al. (2010) and then quantitized, the ensuing inter-respondent matrix and the inter-respondent matrix corresponding to the citation error themes that emerged from Stage 4 were used to conduct a canonical correlation analysis to examine the multivariate relationship between the citation error themes and the APA error themes. The number of canonical functions (i.e., factors) that can be generated for a given dataset is equal to the number of variables in the smaller of the two variable sets (Thompson, 1980, 1984, 1988, 1990). Because five citation error themes were correlated with 14

APA error themes, five canonical functions were generated.

The canonical correlation analysis revealed that the first canonical function was statistically significant and practically significant ($p < .05$; $R_c = .49$) (Cohen, 1988), but the remaining roots were not statistically significant. Thus, only the first canonical root was interpreted. Data pertaining to the first canonical root are presented in Table 3. This table displays both standardized function coefficients and structure coefficients. Using a cutoff correlation of 0.3 (Lambert & Durand, 1975), the standardized canonical function coefficients revealed that the following citation error themes made important contributions: Not in Reference List, Not in Text, and Incomplete or Incorrect References. Not in Reference List made the largest contribution. With respect to the APA error set, the following APA error themes made noteworthy contributions: numbers, citing multiple authors, abbreviations, and quotations. Here, quotations made the greatest contribution. The structure coefficients revealed that the same three citation error variables made noteworthy contributions: Not in Reference List, Not in Text, and Incomplete or Incorrect References. Again, Not in Reference List made the largest contribution. The square of the structure coefficient indicated that Not in Reference List explained 57.8% of the variance. With regard to the APA error themes cluster, the same four themes made noteworthy contributions, namely: numbers, citing multiple authors, abbreviations, and quotations. As before, quotations made the greatest contribution, explaining 54.8% of the variance.

A second canonical correlation analysis was conducted to examine the multivariate relationship between the citation error themes and selected demographic variables—specifically, gender of the lead author, number of authors, length of manuscript, and size of institution of the lead author. Because five citation error themes were correlated with four demographic variables, four canonical functions were generated.

The canonical correlation analysis revealed that the first canonical function was statistically significant and practically significant ($p < .05$; $R_c = .49$) (Cohen, 1988), but the remaining roots were not statistically significant. Thus, only the first canonical root was interpreted. Data (i.e., standardized function coefficients and structure coefficients) pertaining to the first canonical root are presented in Table 4. Again, using a cutoff correlation of 0.3 (Lambert & Durand, 1975), the standardized canonical function coefficients revealed that the following three citation error themes made important contributions: Not in Reference List, Incomplete or Incorrect Citations, and Incomplete or Incorrect References, with Not in

Reference List making the largest contribution. With respect to the demographic variable set, all four demographic variables made noteworthy contributions, namely, gender of the lead author, number of authors, length of manuscript, and size of institution of the lead author, with length of manuscript making the most noteworthy contribution. The structure coefficients revealed that two citation error variables made noteworthy contributions: Not in Reference List and Incomplete or Incorrect References. Again, Not in Reference List made the

largest contribution. The square of the structure coefficient indicated that Not in Reference List explained 12.3% of the variance. With regard to the demographic variable cluster, again, all four variables made noteworthy contributions, with length of manuscript making the greatest contribution for the second time, explaining 60.8% of the variance.

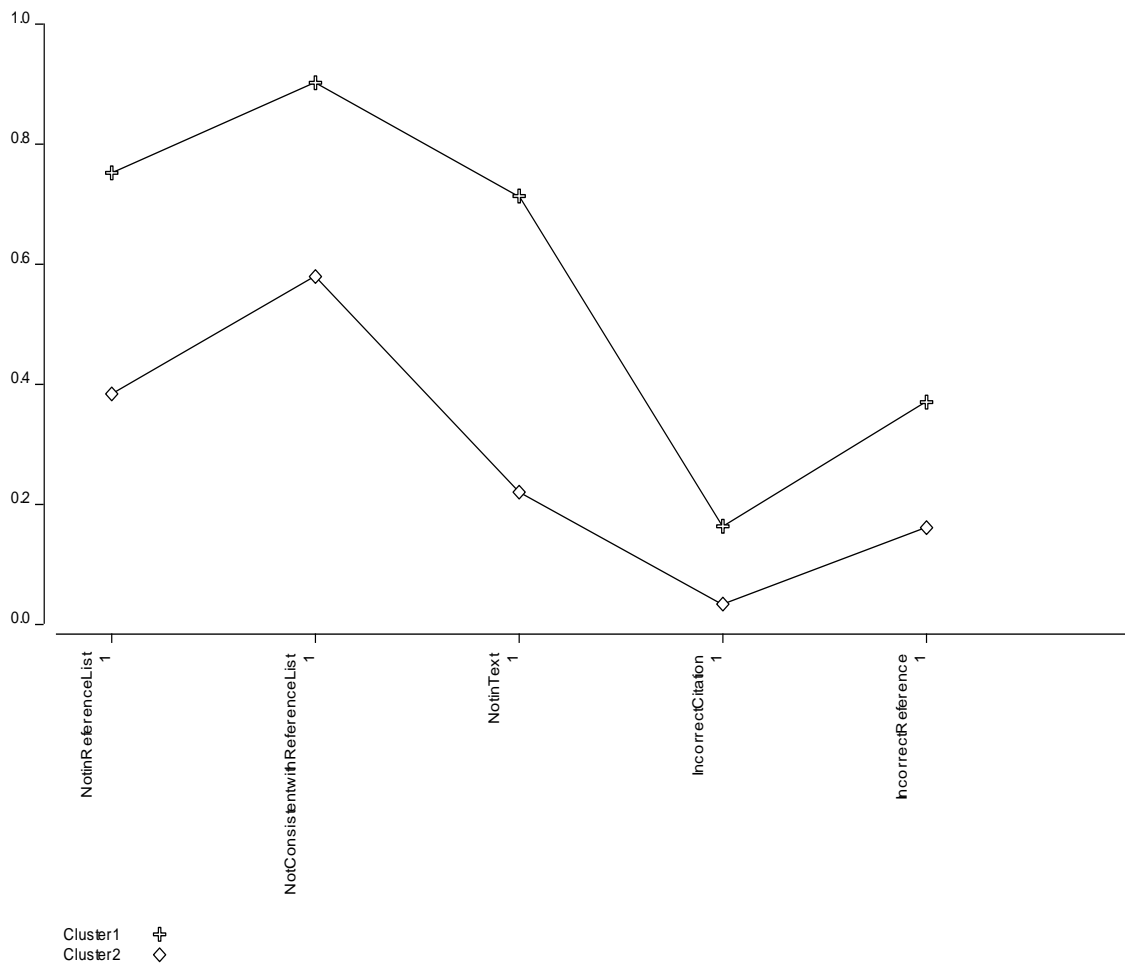


Figure 3. Profiles of most common citation error themes.

Table 3

Stage 8: Canonical Solution for First Function: Relationship Between the Five Citation Error Themes and the 14 APA Error Themes

Variable	Standardized Coefficient	Structure Coefficient	Structure ² (%)
<i>Citation Error Theme:</i>			
Not in Reference List	.68*	.76*	57.8
Not Consistent With Reference List	.15	.27	7.3
Not in Text	.30*	.44*	19.4
Incomplete or Incorrect Citation	.01	.08	0.6
Incomplete or Incorrect Reference	.55*	.58*	33.6
<i>APA Error Theme:</i>			
Numbers	.31*	.38*	14.4
Hyphenation	-.06	.16	2.6
Citing Multiple Authors	.38*	.58*	33.6
In-text citations	.09	.27	7.3
Format	.18	.39	15.2
Capitalization	-.03	.12	1.4
Statistical copy	.08	.23	5.3
Grammar	-.26	-.12	1.4
Abbreviations	.35*	.45*	20.3
Bias in Language	.04	.19	3.6
Quotations	.55*	.74*	54.8
Tables and Figures	-.01	.18	3.2
Punctuation	-.20	.19	3.6
Formality and Clarity	-.02	.19	3.6

*Coefficients with effect sizes larger than 0.3 (Lambert & Durand, 1975)

Table 4

Stage 8: Canonical Solution for First Function: Relationship Between the Four Demographic Variables

Variable	Standardized Coefficient	Structure Coefficient	Structure ² (%)
<i>Citation Error Theme:</i>			
Not in Reference List	.73*	.35*	12.3
Not Consistent With Reference List	-.04	.06	0.4
Not in Text	-.03	.14	2.0
Incomplete or Incorrect Citation	.36*	.20	4.0
Incomplete or Incorrect Reference	.53*	.30*	9.0
<i>Demographic Variable:</i>			
Gender of the lead author	.48*	.30*	9.0
Number of authors	.38*	.41*	16.8
Length of manuscript	.78*	.78*	60.8
Size of institution of the lead author	-.31*	-.32*	10.2

*Coefficients with effect sizes larger than 0.3 (Lambert & Durand, 1975)

Discussion of Findings

The study underlying the present editorial is unique in at least four ways. First, it represents one of only two published studies wherein manuscripts submitted to journals are examined for the prevalence of citation errors. Second, it appears to be the first formal attempt to identify the broad types of citation errors. Third, this editorial appears to be the first attempt to compare the prevalence of citation errors to the 60 most common APA errors that were identified by Combs et al. (2010). Fourth, the present editorial involved the use of mixed analysis techniques wherein quantitative and qualitative analysis techniques were used (Onwuegbuzie & Combs, 2010).

Our current editorial provides compelling evidence that the citation error represents the most prevalent APA error. The prevalence rate of citation errors identified in this study (91.8%) is 1.6 times higher than is the prevalence rate of the most

common APA error identified by Combs et al. (2010)—namely, pertaining to the incorrect use of numbers (57.3%). Further, using the current sample of manuscripts to compare the prevalence rate of citation errors to the prevalence rate of APA errors associated with the use of numbers (i.e., 56.6%)—which, again, was more prevalent than the 59 other APA errors—revealed that the citation error rate was statistically significantly higher (McNemar's Continuity Corrected $X^2(1) = 29.76, p < .001$), with a large effect size (Cramer's $V = .44$). However, what is even more disturbing is that the prevalence rate of 91.8% likely represents a lower bound when one takes into account that these manuscripts were submitted before the writers of sixth edition of APA stipulated that authors include digital object identifiers (DOIs) whenever they are available (cf. section 6.31). According to the writers of the sixth edition of *Publication Manual*, DOI numbers represent unique numbers assigned by the publisher for electronic referencing of published journal

articles and other documents. In a reference list, authors should place the DOI at the end of the reference. Thus, under the sixth edition of APA, failure to include available DOI numbers represents a citation error—specifically, an incomplete reference. Unfortunately, since the release of the sixth edition, with one exception, every author who has submitted an article to *Research in the Schools* mistakenly has omitted DOI numbers. Thus, if the current rate of citation errors prevails, then the inclusion of DOI number omission as a citation error would increase the prevalence rate of citation errors to even higher than 91.8%—likely close to 100%. Yet, as noted by Hughes, Onwuegbuzie, Daniel, and Slate (2010), “with the aid of CrossRef’s website, ...it takes less than 30 minutes to provide DOI numbers for anything other than the longest reference lists” (p. xv).

It might be argued that the high citation error rate identified among manuscripts submitted to *Research in the Schools* represents an outlier. Alternatively, it might be argued that high citation error rates is only a problem for non-Tier I journals such as *Research in the Schools* because a higher proportion of experienced and prolific authors submit manuscripts to Tier I journals. However, Onwuegbuzie et al. (2006) reported a mean citation error rate of 8.00 ($SD = 7.77$) among a sample of manuscripts submitted to the *American Educational Research Journal (AERJ)*, a flagship journal of the American Educational Research Association and a citation error rate of 3.00 ($SD = 3.92$) among a sample of manuscripts submitted to the *Educational and Psychological Measurement*—a Tier 1 journal. Similarly, Onwuegbuzie (2008) documented a citation error rate of 5.70 among a sample of manuscripts submitted to the *Educational Researcher*—another flagship journal of the American Educational Research Association. Thus, it appears that commission of citation errors represents a widespread problem for journal editors and copyeditors—as illustrated by the GIS map (cf. Figure 1).

The extremely high rates of citation errors in published manuscripts likely explain why citation error rates as high as 66.7% have been reported in journals (Onwuegbuzie et al., 2006). It is likely that copyeditors are faced with so many citation errors that they are unable to identify every error. And, with an estimated 50 million published scholarly journal articles in existence (Jinha, 2010), one can only imagine how many citation errors prevail in the published literature worldwide!

The constant comparison analysis led to the identification of five themes that captured the various ways that citation errors can be committed: Not in Reference List, Not Consistent with Reference List, Not in Text, Incomplete or Incorrect Citation, and

Incomplete or Incorrect Reference (cf. Table 1). This finding is useful because it represents an evidence-based deconstruction of the citation error. The prevalence rates pertaining to these five themes have particular practical utility because they assist beginning authors who are learning how to avoid citation errors in focusing their efforts. That is, beginning authors might benefit from focusing initially on avoiding citation errors associated with Not in Reference List and Not Consistent With Reference List errors because these errors were the two most common types of citation errors. Further, we believe that even experienced authors can benefit from this information because, as documented by Onwuegbuzie et al. (2006), they appear to be similarly prone to commit citation errors.

The principal component analysis grouped together Not in Reference List, Not Consistent with Reference List, and Not in Text as one meta-theme (i.e., *Missing or Inconsistent Citations/References*) and Incomplete or Incorrect Citation and Incomplete or Incorrect References as the other meta-theme (i.e., *Erroneous Citations/References*). This finding has intuitive appeal because it indicates that not including a citation/reference in both the body of the manuscript and reference list and presenting the citation and reference in an inconsistent manner are more similar with each other with respect to type of citation error than to the other citation error themes because they involve missing or inconsistent citing/referencing. In contrast, Incomplete or Incorrect Citation and Incomplete or Incorrect References factor together because they primarily involve missing or inaccurate *elements* of the citation/reference itself. The former set of citation errors (i.e., citation error meta-theme) is more than two-and-a-half times more prevalent than is the latter set (i.e., 89.7% vs. 32.3%). Interestingly, all the citation error themes belonging to the first meta-theme statistically significantly and practically significantly grouped the 150 manuscripts into two clusters (i.e., via the latent cluster analysis): one cluster that is relatively high with respect to these three themes and a second cluster that is relatively lower (i.e., moderately high) on these three clusters.

Another interesting finding was that authors of manuscripts representing qualitative research were the most likely to commit citation errors, followed by authors of manuscripts representing mixed research. This result might reflect the concern regarding the fifth edition of the *Publication Manual* expressed by Daniel and Onwuegbuzie (2007) in a previous editorial that it contains

a very heavy, if not exclusive, bias toward quantitative research. For example, there are multiple descriptors that pertain to the reporting of quantitative data (e.g., statistical

and mathematical copy; statistical symbols; statistics; p. 435). This index also includes quantitative-based descriptors...Yet, the index section of the *Publication Manual* does not include corresponding descriptors for reporting qualitative methods, data, data analysis, and inferences. As noted in Zeller and Farmer (1999), who critiqued the fourth edition of the *Publication Manual*—and which still appears to be accurate for the latest edition of the *Publication Manual*—“Judging from its structure and content, it would seem that, at best, the *Manual* is indifferent to qualitative research or, at worst, inhospitable to qualitative research’s assumptions about knowledge and language” (p. 10). Nor are there any descriptors pertaining to mixed research. Thus, qualitative and mixed methods researchers have minimal explicit guidance for writing reports that are consistent with APA style. (p. ix)

Further, commenting on the sixth edition of the *Publication Manual*, Hughes et al. (2010) surmised that “Slightly more attention to the reporting of qualitative research appears to have been paid in the sixth edition compared to the fifth edition...However, it is clear that the inequity has not been redressed” (p. xiv). Thus, it is possible that at least some authors of manuscripts representing qualitative research and mixed research might hold the mistaken view that the *Publication Manual* does not apply as much to them as it does to authors of manuscripts representing quantitative research. Alternatively, even if no difference exists in the perceived relevance of the *Publication Manual* among authors of manuscripts representing quantitative, qualitative, and mixed research, the lack of guidance given to authors of manuscripts representing qualitative and mixed research makes it more likely for them to commit APA errors in general and citation errors in particular. Consistent with this assertion, not only did authors of manuscripts representing qualitative and mixed research commit more citation errors but statistically significant differences emerged among these three groups with respect to the total number of APA errors ($X^2[3] = 8.52, p = .036$, Cramer’s $V = .15$). As such, we recommend that in future editions of the *Publication Manual*, the writers of APA provide more guidance to authors of manuscripts representing qualitative and mixed research. Indeed, just as a APA task force was set up to guide APA policy regarding the reporting of quantitative research (i.e., Wilkinson & the Task Force on Statistical Inference, 1999), perhaps similar task forces can be set up to inform

future APA policy regarding the reporting of qualitative and mixed research.

Two particularly compelling findings were that (a) manuscripts that were accepted contained statistically significantly and practically significantly fewer citation errors than did manuscripts that were not accepted and (b) authors who committed citation errors associated with Not in Reference List or Incomplete or Incorrect Citations were statistically significantly and practically significantly more likely to have their manuscripts rejected. Although these correlational findings do not imply that having a large number of citation errors *causes* a manuscript to be rejected or *prevents* a manuscript from being accepted, because the canonical correlation analysis revealed that certain citation errors were predictive of APA errors, Combs et al.’s (2010) statement is pertinent here that such errors are “indicative of a general lack of attention to detail that prevails at one or more stages of the research process, which leads to a flawed study and/or incomplete or confusing manuscript—and subsequent rejection” (pp. xxiv-xxv). Indeed, APA errors in general and citation errors in particular are symptomatic of a larger problem of carelessness, which is consistent with our experience reviewing hundreds of manuscripts over the years that have been submitted to dozens of journals. Thus, as did Combs et al. (2010), we implore authors to be as careful as possible when preparing their manuscripts in general and compiling their reference lists in particular.

Although the manuscripts with fewer citation errors were statistically significantly and practically significantly more likely to be accepted for publication, the fact that the majority of them contained more than three citation errors nonetheless is disturbing. In fact, 25% of these accepted manuscripts contained six or more citation errors, with one accepted manuscript containing 10 citation errors and another accepted manuscript containing 12 citation errors. Such unacceptably high citation errors among accepted manuscripts help to explain why citation errors in published manuscripts are so rampant. Indeed, the more citation errors contained in accepted manuscripts the more likely it is that the reviewers and editors will fail to identify one or more of them, which presents the next problem: the manuscripts then might be passed on to the copyeditor who is faced with copyediting multiple manuscripts for an issue within a short time frame—some or all of which also might contain citation errors—who, in turn, might lead to him or her failing to identify one or more of these citation errors.

The canonical correlation analysis revealed a statistically significant and practical significant multivariate relationship between citation error themes and the APA error themes. This relationship

was mainly characterized by the relationship between citation errors associated with Not in Reference List, Not in Text, and Incomplete or Incorrect Reference on the one side (with Not in Reference List making the greatest contribution), and APA errors associated with numbers, citing multiple authors, abbreviations, and quotations on the other side (with quotations making the greatest contribution) on the other side. The fact that these four APA error themes were important predictors of citation errors has intuitive appeal. Specifically, it is consistent with logic that authors who struggle citing multiple authors and are unable to provide quotations that are compliant with the APA style also tend to commit citation errors because these elements culminate in references having to be provided. Also, the fact that authors who incorrectly use numbers tend to commit more citation errors might be explained by the nature of each reference list entry, which includes one or more sets of numbers such as publication year, volume number, issue number, edition number, and page numbers. Thus, it is likely that committing APA errors related to numbers is more associated with having incomplete or incorrect references than it is to having other types of citation errors. In any case, future research should investigate this potential link. Similarly, it is possible that authors who incorrectly use abbreviations tend to commit citation errors associated with having incomplete or incorrect references more than they commit the other types of citation errors.

The statistically significant and practical significant multivariate relationship between the citation error themes and selected demographic variables also is extremely interesting. Indeed, all four variables made noteworthy contributions, namely, gender of the lead author, number of authors, length of manuscript, and size of institution of the lead author, with length of manuscript making the most noteworthy contribution. Specifically, authors who committed citation errors associated with Not in Reference List, Incomplete or Incorrect Citations, and Incomplete or Incorrect References tending to (a) have a female lead author or sole author, (b) have a lead author or sole author from a smaller institution, (c) be longer, and (d) involve more co-authors. That female lead authors are more likely to commit certain types of citation errors than are male co-authors is worthy of further investigation.

Our finding that lead authors from smaller institutions tend to submit manuscripts with more citation errors likely reflects the fact that female lead authors who submit manuscripts to *Research in the Schools* tend to reside in smaller institutions than do male lead authors (R. K. Frels, Onwuegbuzie, & Slate, 2009). Indeed, for the present sample, the female lead authors statistically significantly resided

in smaller institutions ($M = 14,768.91$, $SD = 8,532.47$) than did the male lead authors ($M = 18,965.64$, $SD = 11,874.85$), with a moderate effect size of 0.45 (Cohen, 1988). The result that longer manuscripts tended to contain more citation errors is not surprising. However, it helps to justify our recommendation that authors of longer manuscripts should pay extra attention to checking in-text citations and reference lists.

Finally, the finding that manuscripts involving more co-authors commit more citation errors is particularly disturbing and suggests that when many co-authors are involved, different authors write different sections, which makes it more difficult to coordinate the reference list. Most disturbingly, the positive relationship between the number of authors and the number of citation errors suggests that the bystander effect might prevail (Darley & Latané, 1968; Hudson & Bruckman, 2004; Levine & Thompson, 2004), wherein the presence of multiple co-authors encourages inaction in checking the in-text citations and the reference list carefully. This inaction might stem from pluralistic ignorance (i.e., failure of other co-authors to check the in-text citations and the reference list indicates to that co-author that such a check is not necessary) or diffusion of responsibility (i.e., all co-authors assume that one or more of the other co-authors will check the in-text citations and the reference list such that each co-author feels less responsible for conducting this check and so refrains from doing so) (Levine & Thompson, 2004). Alternatively, the citation error-based bystander effect might reflect an assumption by each co-author that one or more of the other co-authors are more qualified to check the in-text citations and the reference list and thus their assistance is not needed. Indeed, they might even believe that conducting this check might reveal their ineptness. As authors ourselves of more than 500 published works among us, we have noticed this same bystander effect when large groups of co-authors have been involved. Consequently, it is clear that leadership is needed in eliminating citation errors for manuscripts that involve multiple co-authors.

Practical Recommendations

According to Ware (2006),

There are approximately 23,000 scholarly journals in the world, collectively publishing 1.4 million articles a year. The number of articles published each year and the number of journals have both grown steadily for over two centuries, by about 3% and 3.5% per year respectively. The reason is the equally persistent growth in the number of researchers, which has also grown at about

3% per year and now stands at around 5.5 million. (p. 3)

Ware (2006) also noted that

Journals form a core part of the process of scholarly communication and are an integral part of scientific research itself. Journals do not just disseminate information, but also they provide a mechanism for the registration of the author's precedence; maintain quality through peer review and provide a fixed archival version for future reference. They also provide an important way for scientists to navigate the ever-increasing volume of published material. (p. 3)

Similarly, Jinha (2010) estimated that between 1,477,382 and 1,504,600 scholarly articles were published worldwide in 2009. With such a vast amount of literature being published on a yearly basis, it is even more important that citation errors are avoided because such errors at best increase the time and effort needed for authors and lay people to retrieve articles of interest and, at worst, reduce or even eliminate the accessibility of these articles. As such, citation errors not only adversely affect both the trustworthiness of the cited literature, the validity of the primary research findings, and, hence, the credibility and integrity of the author(s) making the citation errors; they also potentially affect the quality of literature of authors who have difficulties retrieving cited literature that represent citation errors. Thus, as noted earlier, citation errors represent the most serious of APA errors. As such, it is imperative for the trend of citation errors to be reversed and replaced by what Jiao et al. (2008) referred to as a "culture of error free citations" (p. 954).

Our findings suggest a number of recommendations for creating a culture of error free citations, which we delineate in the following sections. First, we provide recommendations for college-level instructors, mentors, advisors, and thesis/dissertation committee members and chairs/supervisors. Second, we present recommendations for authors. Third, we provide recommendations for journal editors. These recommendations are followed by a provision of recommendations for copyeditors/ typesetters/ production editor/publishers. Finally, we provide suggestions for the writers of future editions of the *Publication Manual*.

Recommendations for College-Level Instructors, Mentors, Advisors, and Thesis/Dissertation Committee Members/Chairs

As noted earlier, extremely high *among-manuscript* citation error rates (i.e., proportion of

authors who commit citation errors) prevail. However, Waytowich et al. (2006) documented similarly high *within-manuscript* citation error rates (i.e., number of citation errors expressed as a proportion of the total number of citations in the document) among doctoral students—with the citation error rates of doctoral dissertation proposals being as high as 90.91% ($M = 33.45\%$, $SD = 21.15\%$). Thus, it is very likely that the unacceptable rates of citation errors observed in manuscripts submitted to journals and in published articles stem from citation errors committed during (post)graduate education that were not identified. As such, we urge college instructors, mentors, and advisors to stress continually to their students the importance of avoiding citation errors. Moreover, we recommend strongly that whenever possible, college instructors not only strive to identify citation errors in assignments written by their students, but they also make students accountable for them. For example, for the past 17 years, the lead author of this editorial has deducted one percentage point for every missing, incomplete, or inconsistent reference. This point-deduction policy also has been stated in bold in every one of his syllabi. This citation error policy has reduced the number of citation errors that would otherwise have prevailed.

However, despite this accountability, to date, not one student has been able to submit an (assigned) manuscript (including dissertations) that did not contain any citation errors—including students who subsequently have become prolific authors! This finding provides compelling evidence of how difficult it is to avoid citation errors.

Also, we recommend that chairs/supervisors of thesis/dissertation committees or at least one member of thesis/dissertation committees check the thesis/dissertation document for citation errors. Even if the instructor or thesis/dissertation committee chair/member does not have sufficient time to check the whole document for citation errors—as often might be the case—he/she can check a segment of it, such as the opening several paragraphs or a random set of paragraphs. For theses and dissertations, students might be encouraged to seek the assistance of professional editors whose role would include checking for citation errors. Alternatively, if the college dean could afford it, he/she might hire a professional proof-reader/copyeditor to check all dissertations before they are considered to be in final form. Whatever strategy is used to check citation errors, it should be made clear to students that the onus is on them to submit documents with error free citations at every draft.

Students also should be taught what appears to be the most effective manual way to check their own documents for citation errors, which is to print out

the whole document and compare every in-text citation (i.e., line-by-line) with the corresponding entry in the reference list, as well as to proof-read their reference lists several times for incomplete or inaccurate references. Students also could be taught how to conduct a secondary electronic check for citation errors. Specifically, they could use the search function of their word processing software programs (e.g., for the Word program, they could depress the Control key [i.e. “Ctrl”] and “F” key simultaneously) to check that any references cited in the reference list that they did not locate in the text definitely does not appear anywhere in the text. Also, the spell check function (e.g., depressing the “F7” function for the Word program) could be used to detect Not in Text citation errors and Not Consistent with Reference List citation errors. If the user of the spell check function uses the “Ignore All” option when the spell check function *incorrectly* identifies an author’s name as representing a misspelling, then any author that is identified in the reference list would represent either an author that does not appear in the text (i.e., a potential Not in Text citation error) or an author that is spelled differently in the text (i.e., a Not Consistent with Reference List citation error). The only time when an author is identified in the reference list via the spell check function is if the author is (a) a non-lead author of a work that contains six or seven authors or (b) the last author of a work that contains more than seven authors (see section 6.27). However, we would like to reiterate that using this electronic strategy by itself to check for citation errors always will be insufficient. Rather, this electronic strategy always should be combined with a rigorous manual check.

An even more reliable way of avoiding citation errors is for students to use one of dozens of reference management software packages such as EndNote, RefMan, and ProCite. These software packages can not only download references directly from the electronic databases (e.g., EBSCOHost), but also they can automatically format the citation into any of several hundred formats (e.g., APA style, Chicago Manual of Style). We encourage interested authors to read documentation that compare the various free (e.g., <http://mahbub.wordpress.com/2007/03/04/comparison-of-free-bibliographic-managers/>) and commercial (e.g., <http://www.adeptsience.co.uk/products/refman/reference/chart.html>) reference management software packages. Whenever such software packages are used, the author(s) should remember to turn off the application before submitting it for review so that the reader/editor can edit the references as needed. Even if reference management software packages are used, the student should still double-check the document manually for citation errors because none of these

reference management software packages are 100% error free.

Avoiding citation errors is not only pertinent for graduate students but also for undergraduate students. Thus, college and university personnel who are responsible for the educational development of undergraduate students also should take steps to create and to maintain a culture of error free citations. In fact, because an increasing number of public school teachers require that their students write research reports (see, for e.g., Mallette, 2008, 2009), middle and high school teachers also need to instill a culture of error free citations in their classrooms.

Recommendations for Authors

It is clear that the overwhelming majority of authors (i.e., 91.8%) who *submit* manuscripts to *Research in the Schools* commit citation errors. Also, citation errors have been identified in the majority of articles *published* in some journals (e.g., Gosling et al., 2004; Ngan Kee et al., 1997; Roach et al., 1997). Based on the findings of our study, several types of authors appear to be particularly at risk for committing citation errors: female lead author or sole author, lead authors or sole authors from smaller institutions, authors of long manuscripts, and authors with several co-authors. However, the majority of authors need to make greater efforts to check their in-text citations and reference lists. Many of the recommendations provided earlier for graduate students (e.g., printing out the manuscript and checking citations line-by-line, using reference management software packages) pertain to authors of manuscripts that are submitted to journals. Further, we recommend that authors avoid citing secondary sources because these sources prevent authors from identifying errors made by authors who have previously cited these sources.

In addition, authors should be encouraged by copyeditors/production editors/publishers to check the in-text citations and reference lists when they receive galley proofs (also known as galleys, which are proofs issued during the proofreading and copy-editing review phase) or page proofs (i.e., proofs that are created in a near-final version for the purposes of editing and checking). Copyeditors/production editors/publishers typically request that authors read the page proofs carefully. For example, for the journal *School Psychology Quarterly*, the following directions are provided:

Please read over your article carefully, as this will be your last opportunity to review the article prior to publication. APA now publishes journal articles Online First, in advance of print issues. Once corrections have been submitted and incorporated, your article could be published Online First within 2-3 weeks. Once your article

has been released for Online First publication, no additional corrections may be made without a formal correction notice. The Editor makes all final decisions regarding the publication order for print issues.

Your article has been copyedited to conform to APA style and for grammar, punctuation usage, and formal consistency. Other changes in wording are intended to more clearly convey your meaning; if meaning has been altered, please suggest an alternative that will restore the correct meaning and clarify the original passage. Please be sure to respond to any queries that appear on the last page of the proof. Proofread the following elements of your article especially carefully:

Tables

Equations and mathematical symbols

Figures (including figure and caption placement)

Non-English characters and symbols

Although these directions are very clear, no directive is present to check in-text citations and reference list. Unfortunately, this omission is very typical. Indeed, of the hundreds of galley proofs that we have received as authors or editors over the last 2 decades, we have very rarely seen such a directive. Consequently, we suspect that only a few authors rigorously check for citation errors at the page proofs stage. We encourage all authors to check page proofs for citation errors, regardless of whether they are prompted to do so by the copyeditor/typesetter/production editor /publisher. A check for citation errors not only should involve checking the in-text citations and reference list but also checking their own names and affiliations (at the top of the first page of the page proofs), as well as the title of the article. As authors, on several occasions, we have observed errors made that pertain to these elements. These errors are even more serious because they will lead to errors being recorded in the databases that archive and index journal articles, which, in turn, will lead to future citation errors when authors cite this work—thereby promoting a cycle of citation errors for this article, as occurred for 50 years with Jaroslav Hlava’s article that we described earlier.

Further, we recommend that for articles that involve multiple authors, all authors proof-read the page proofs carefully and avoid promoting the bystander effect by relying only on the lead author or a designated author to proof-read the page proofs. As authors, we have experienced co-authors who informed us that they were either too busy to proof-read the page proofs or they did not feel the need to read it in light of the lead author reading it. We believe that such reasoning is problematic. Indeed, on some occasions, we have missed important citation

errors that other co-authors have caught. Thus, our motto is, “There can never be too many pairs of eyes to proof-read page proofs!”

Recommendations for Journal Editors

Although citation errors rest squarely on the shoulders of authors, journal editors also have an ethical responsibility to avoid them. Journal editors have several strategies at their disposal that might help reduce the prevalence of citation errors. In particular, editors can implement an internal review process wherein one of the requirements of a desk reject is if one or more citation errors are identified. However, authors should be given the opportunity to revise and to resubmit their manuscripts if citation errors are the only major problem identified during the internal review process. Alternatively, for journals that involve an electronic submission process, authors could be asked to declare (e.g., by checking an option that declares) that they have examined their in-text citations and reference lists carefully and that to the best of their knowledge their manuscript does not contain any citation errors. For non-electronic submissions, authors could be required to indicate on a checklist that to the best of their knowledge their manuscript does not contain any citation errors. We suggest that authors also be made to declare that they have presented all available DOI numbers for the articles that they cite. Obviously, such a declaration would not guarantee a citation error-free manuscript. However, it should ensure that authors at least pay more attention to avoiding citation errors. Although requiring that authors make such declarations might seem draconian for some authors, they should bear in mind that citation errors represent an ethical issue. Also, they should bear in mind that reporting available DOI numbers “provide[s] persistent link to its location on the Internet” (APA, 2010, p. 189). As noted by APA (2010),

if the DOI is referenced...the reader can simply enter the DOI into the DOI *resolver* search field provided by the registration agency CrossRef.org and be directed to the article or a link to purchaseLocating the article online with the DOI number will give you electronic access to any online supplemental archives associated with the article. (p. 189)

Journal editors also can ask reviewers/editorial board members to be on the lookout for citation errors, although requiring or expecting them to undertake a rigorous check of the in-text citations and reference list errors likely would place too much burden on reviewers, the overwhelming majority of whom review manuscripts *pro bono*.

Recommendations for Copyeditors/ Typesetter/ Production Editor/Publishers

Citation errors do not only reflect poorly on the author(s) (primarily) and editor(s) of a journal (secondarily), they also reflect poorly on the publisher and publishing team. And in a lucrative industry—for which the global market for English-language STM (scientific, technical, and medical) journals alone is approximately \$5 billion (Ware, 2006)—reputation could translate to a reduction in the customer base and, subsequently, a loss in profits. Indeed, with costs of managing the peer review process varying between \$60 and \$635 per article and with the average total cost of publishing a journal article with a print and electronic edition being estimated at \$3,750 (Ware, 2006), failing to reduce citation errors can be costly for publishers. Thus, the onus also is on members of the publishing team to find ways to eliminate citation errors.

A relative simple but potentially effective strategy that publishers can use is to ensure that all page proofs contain explicit directions for authors to check carefully each in-text citation and reference list entry. Further, it has been our experience as authors that those individuals responsible for sending page proofs to authors typically give them between 48 and 72 hours to proof-read the page proofs and notify them of any corrections. Although we recognize the importance of publishing journal issues in a timely manner, we recommend that, whenever possible, publishers should give authors more than 72 hours to review page proofs that would provide them with additional time to check the in-text citations and reference lists. Even if more time cannot be provided, at the very least, those individuals responsible for sending page proofs to authors should give them advance notice regarding the approximate time they will receive the page proofs so that authors can set aside time to check the proofs.

Recommendations for Writers of Future *Publication Manuals*

Writers of future *Publication Manuals* have a vital role to play in eliminating the trend of citation errors and promoting a culture of error free citations. Thus, we recommend that they devote much more than one paragraph—as was the case in the sixth edition—to discussing this issue. In particular, they could use findings such as those results in our present editorial to provide evidence regarding how prevalent citation errors are. Moreover, they should make clear how serious citation errors are, as well as their ethical implications. In section 6.17, the writers of the sixth edition provide an example of how to cite a work discussed in a secondary source (cf. APA, 2010, p. 178). Unfortunately, this example suggests that they endorse the use of secondary sources. We encourage

writers of future *Publication Manuals* to discuss the potential of secondary sources to lead to citation errors (as well as the inaccurate reporting of findings or other information contained in the original work) and to specify explicitly that authors should refrain from using secondary sources and, as a worst case scenario, use the abstract as a secondary source (cf. APA, 2010, p. 202).

Conclusions

Indubitably, the citation error not only represents the most serious APA error but it also represents the most prevalent APA error. As such, a collective effort is needed to end the cycle of citation errors and create a culture of error free citations that involves college-level instructors, mentors, advisors, and thesis/dissertation committee members and chairs/supervisors, authors, journal editors, members of the team of publishers, and writers of future editions of the *Publication Manual*. We have attempted to provide evidence-based guidelines for the various members of the professional community who play a role at various stages in the quality of articles that authors write. However, our list of suggestions is by no means exhaustive. Indeed, we encourage members of these different sectors to develop other strategies for reducing the prevalence of citation errors. In the meantime, we urge researchers from various fields to monitor the commission of citation errors in both manuscripts submitted to journals and published articles—especially in countries with the fastest scientific output growth rate over the last 2 decades such as the Middle East and Asia in general and Iran in particular, whose scientific output has grown 11 times faster than the world average (MacKenzie, 2010).

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