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Editorial: Frequency in the Use of Visual Displays and its Predictability of the Editor's Decision of Manuscripts Submitted to *Research in the Schools*

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Much has been written about the importance of *writing with discipline* in order to increase the readability and, hence, the publishability of manuscripts submitted to journals for consideration for publication. More specifically, empirical evidence has been provided that links American Psychological Association (APA) errors, citation errors, reference list errors, and grammatical errors to manuscript rejection by the editor. However, scant attention has been paid to what we refer to as *displaying with creativity*. Thus, in this study, we analyzed the use of visual displays—specifically, the use of tables and figures in 71 manuscripts submitted to the journal *Research in the Schools* over a 4-year period. Findings revealed that the majority (i.e., 80.3%) of manuscripts contained one or more visual displays, with a statistically significantly and practically significantly higher proportion of manuscripts containing tables than figures. Further, the qualitative research manuscripts contained statistically significantly and practically significantly fewer tables and figures than did both the quantitative research manuscripts and the mixed methods research manuscripts, with very large effect sizes (Cohen's d = 1.09 and 0.93, respectively). Most notably, manuscripts that received a decision of either accept or revise-and-resubmit (92.1%) were statistically significantly (Cramer's V = .32) and practically significantly (Odds Ratio = 2.04; 95% confidence interval = 1.33, 3.12) more likely to contain one or more tables and/or figures than were manuscripts that received a decision of reject (66.7%). Implications of these findings are discussed.

Keywords: *Research in the Schools*, writing with discipline, displaying with creativity tables, figures, manuscript rejection, manuscript acceptance

As declared by the authors of the Publication Manual of the American Psychological Association (APA, 2010):

> Since the last edition of the Publication Manual, few areas have been affected by technological developments more dramatically than the methods available for the display of results of experimentation and inquiry-tables, graphs, charts, maps, drawings, and photographs. Almost all displays are now the results of electronic manipulation of basic data-be it with word-processing programs, spreadsheet programs, statistical packages, or highly specialized software for creating digital images. These changes have greatly increased the flexibility that authors have for effectively displaying results. (p. 125).

As a result of these technological developments, authors now have numerous ways that they can visually display information. These ways of displaying information can be categorized as falling into one of the following two categories: tables or figures. In general, the major difference between tables and figures is that "tables are almost always characterized by a row-column structure. Any type of illustration other than a table is referred to as a figure" (APA, 2010, p. 125).

Visual displays can be presented to fulfil several purposes that include the following:

- **exploration**: the data contain a message, and you would like to learn what it is

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(exploratory data analysis and data mining techniques are examples of displays that are principally exploratory);

- **communication**: you have discovered the meaning contained in the data and want tell others about it (this is the traditional purpose of most data displays in scientific documents);
- **calculation**: the display allows you to estimate some statistic or function of the data (nomographs are the archetype of this);
- **storage**: you can store data in a display for retrieval later, including the results of a study for later use in a meta-analysis (historically, this role has been fulfilled by tables, but figures sometimes serve this purpose more efficiently); and
- **decoration**: data displays attract attention, and you may choose to use them to make your manuscript more visually appealing (as in newspapers and other media reports). (APA, 2010, pp. 125-126) [emphasis in original]

Tables and figures are most often used to display data in the results section of both monomethod (i.e., quantitative *or* qualitative) research studies, and mixed methods research studies. With respect to mixed methods research studies, not only can they contain quantitative-based tables and figures and/or qualitative-based tables and figures, but also they can contain what Onwuegbuzie and Dickinson (2008) refer to as crossover displays that "summarize and integrate both qualitative and quantitative results within the same framework" (p. 205). More specifically, crossover displays of findings involve the display of findings that occur after some form of crossover mixed (methods) analysis has taken place. Crossover mixed analyses involve using techniques from one tradition (e.g., quantitative) to analyze data associated with the other tradition (qualitative) (Hitchcock & Onwuegbuzie, 2019; Onwuegbuzie & Combs, 2010) in order to address the nine purposes of analysis described by Onwuegbuzie and Combs (2010): reduce, display, transform, correlate/associate, consolidate, compare, integrate, assert, and/or import data. Crossover mixed analyses include methods such as *quantitizing*, which involves transforming qualitative data into numerical codes that can, in turn, be subjected to statistical analyses (Miles & Huberman, 1994; Onwuegbuzie & Teddlie, 2003; Sandelowski, Voils, Knafl, 2009; Tashakkori &Teddlie, 1998); and *qualitizing*, which involves transforming numerical data into narrative form, that, subsequently, can be subjected to qualitative analyses (Onwuegbuzie & Leech, 2019; Tashakkori & Teddlie, 1998). Figure 1 provides an example of a crossover mixed analysis display that was created by Onwuegbuzie et al. (2007) based on the findings from an exploratory factor analysis (i.e., quantitative data analysis) of themes (i.e., qualitative data)—representing a crossover analysis.

A special case of crossover mixed analyses are what are known as joint displays, which involve presenting both qualitative and quantitative findings (Fetters, Curry, & Creswell, 2013; Guetterman, Fetters, Curry, & Creswell, 2015), which involve "using tables or figures that combine and display both quantitative and qualitative data together" (Johnson, Grove, & Clarke, 2019, p. 301). Therefore, joint displays reflect Fetters and Freshwater's (2015) recent call for integration in mixed methods research in order to "produce a whole through integration that is greater than the sum of the individual qualitative and quantitative parts….Quantitatively, we express this as 1 + 1 = 3. That is, qualitative + quantitative = more than the individual components" (pp. 115-116). These authors expressed this synergy as the *1+1=3 integration challenge* in mixed methods research (Fetters & Freshwater, 2015). However, Onwuegbuzie (2017a) and Onwuegbuzie and Hitchcock (2019) argue that this integration formula emphasizes a quantitative-qualitative separation that can prevent a more complete kind of integration. Instead, they posit a *1+1=1 integration formula* that denotes a more comprehensive and dynamic characterization of integration and which involves the data collection, data analysis, *and* data interpretation phase. Therefore, contrastingly, crossover displays reflect this 1+1=1 integration formula, which allow researchers to be even more creative in developing their visual displays. Notwithstanding, regardless of the integration formula used to create visual displays, it is clear that mixed methods researchers have an even wider array of visual displays at their disposal than do both quantitative researchers and qualitative researchers.

Although visual displays appear more in the Results section of empirical reports than in any other section, it should be noted that they can appear in any of the 12 components of a research study categorized by Onwuegbuzie and Frels (2016). As seen in Figure 2, these 12 components are as follows: problem statement, literature review, theoretical/conceptual framework, research question(s), hypotheses, participants, instruments, procedures, analyses, interpretation of the findings, directions for future research, and implications for the field. For example, figures can be used to display

the three major types of research frameworks, namely, *conceptual frameworks* (i.e., ''an argument that the concepts chosen for investigation, and any anticipated relationships among them, will be appropriate and useful given the research problem under investigation''; Lester, 2005, p. 460), *theoretical frameworks* (i.e., ''developed by using an established, coherent explanation of certain sorts of phenomena and relationships''; Lester, 2005, p. 458), and *practical frameworks* (i.e., "not informed by formal theory but by the accumulated practice knowledge of practitioners and administrators, the findings of previous research, and often the viewpoints offered by public opinion"; Lester, 2005, p. 459). Indeed, it could be argued that using visual displays to represent a research framework adds clarity. As another example, a visual display can be used to map out the sampling design (e.g., type of sampling schemes [i.e., purposive vs. random], sampling scheme [e.g., stratified random sampling, cluster sampling, convenience sampling, criterion sampling; cf. Collins, Onwuegbuzie, & Jiao, 2007; Onwuegbuzie & Collins, 2007; Teddlie & Yu, 2007], sample size, subsample size[s], group size[s] per approach, number of observational units per participant).

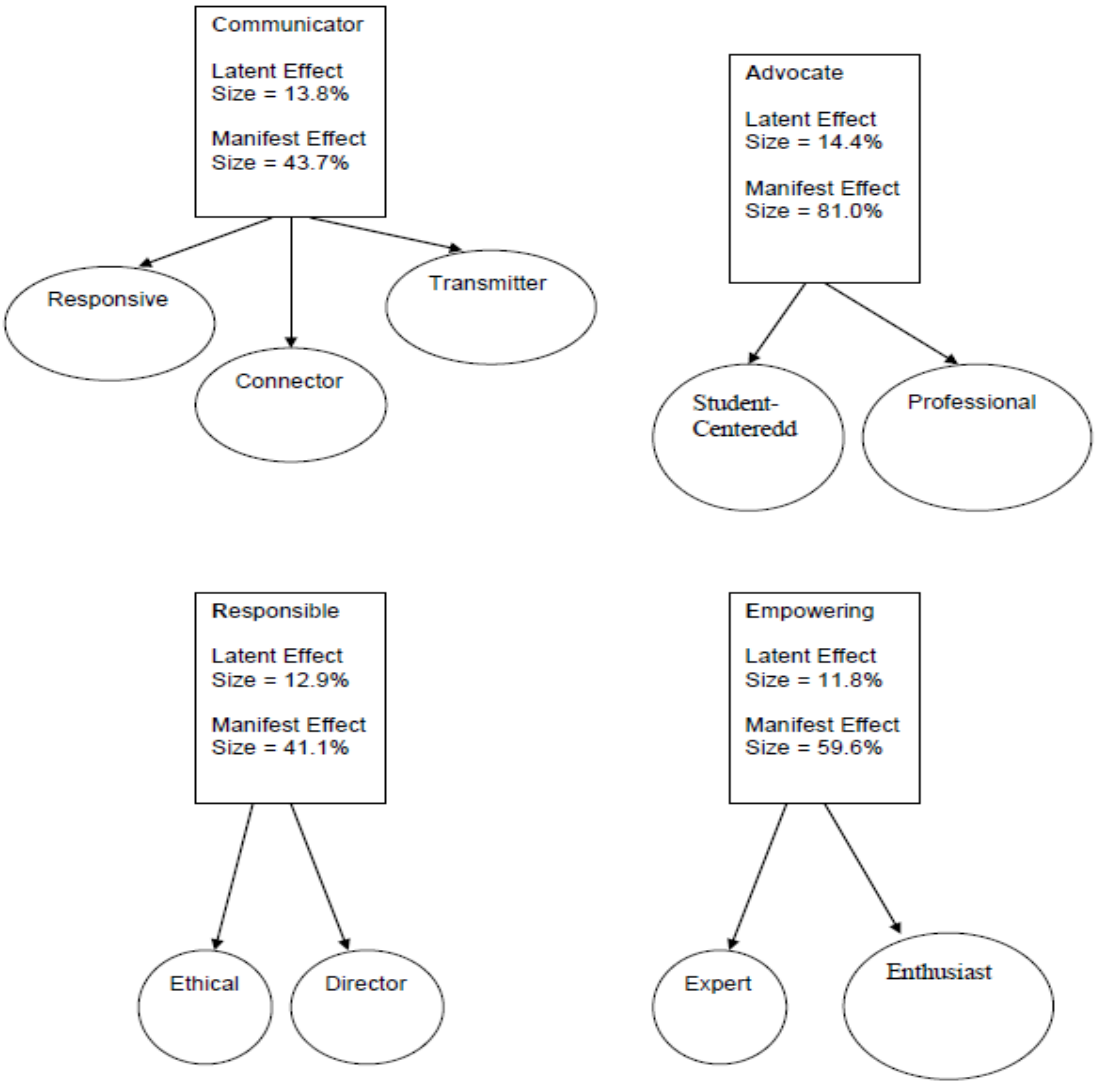

Figure 1: Thematic structure pertaining to students' perceptions of the characteristics of effective college instructors: CARE-RESPECTED Model of Effective College Teaching.

Adapted from "Students' perceptions of characteristics of effective college teachers: A validity study of a teaching evaluation form using a mixed methods analysis," by A. J. Onwuegbuzie, A. J., A. E. Witcher, K. M.

T. Collins, J. D. Filer, C. D. Wiedmaier, and C. W. Moore, 2007, *American Educational Research Journal, 44*, p. 135. Copyright 2007 by Sage Publications.

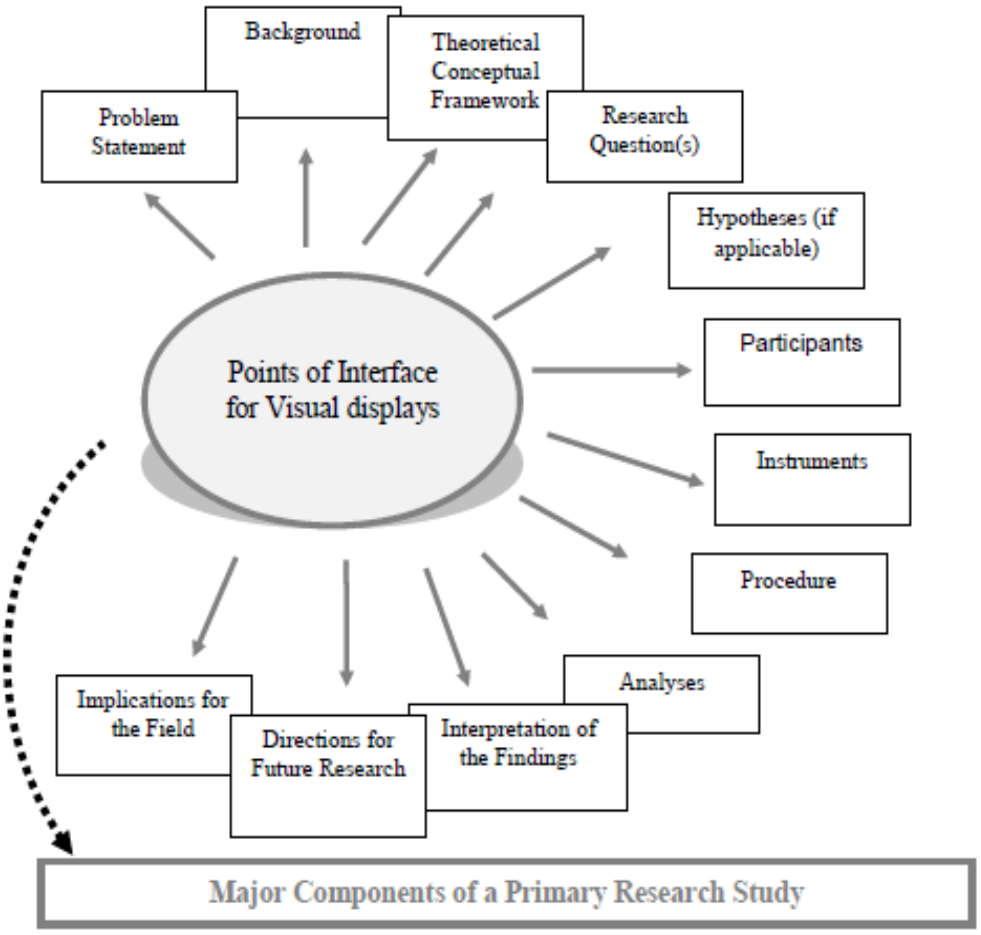

Figure 2. The points of interface for visual displays in primary research reports.

Adapted from "Seven steps to a comprehensive literature review: A multimodal and cultural approach," by A. J. Onwuegbuzie and R. K. Frels, 2016, p. 59. Copyright 2016 by Sage Publications.

In the Publication Manual, the authors of APA (2010) discuss visual displays in Chapter 5, a chapter that is entitled "Displaying Results" (p. 125). This title, alongside subheadings contained in this chapter such as "5.01 Purposes of Data Displays" (p. 125), "5.02 Design and Preparation of a Data Display" (p. 126), "5.06 Permission to Reproduce Data Displays" (p. 128), and "5.18 Presenting Data in Specific Types of Tables" (p. 141), alongside using the word "data" a total of 78 times in this chapter as well as the focus on presenting findings, likely give some/many/most researchers the impression that visual displays are (mainly) meant for the Results section of empirical results. And unfortunately, the authors of APA (2010) do not state explicitly that visual displays can and should be used anywhere in empirical reports, as well as methodological/conceptual/theoretical works. Thus, it is possible that this lack of encouragement by the authors of APA (2010) might lead to authors of manuscripts not maximizing their visual displays. However, to date, the prevalence of the use of visual displays in manuscripts submitted for consideration

for publication has not been the subject of formal study.

Purpose of Study

With the aforementioned discussion in mind, the purpose of our research study was threefold. Our first purpose was to examine the prevalence of tables and figures in manuscripts submitted to a journal—specifically, *Research in the Schools*—for consideration for publication (Quantitative phase; QUAN). Our second purpose was to examine the relationship between the use of tables and figures and four demographic features of the manuscript that previously have been linked to variables associated with writing with discipline, such as quality of grammar (Onwuegbuzie, 2017b), avoidance of citation errors (Onwuegbuzie, Frels, & Slate, 2010), readability (Onwuegbuzie, Mallette, Hwang, & Slate, 2013), and communication vagueness (Onwuegbuzie, 2018), namely, number of authors, number of manuscript pages, gender of the lead author, and the genre of manuscript (i.e., quantitative empirical research vs. qualitative empirical research vs. mixed methods empirical research vs. conceptual/theoretical) (QUAN). Our third purpose was to determine the predictability of the use of tables and figures on the quality of empirical manuscripts submitted to a journal for consideration for publication, as indicated by their eventual disposition (i.e., accept/revise-and-resubmit vs. reject) (QUAN). Specifically, the following three research questions were addressed:

1. What is the prevalence of the use of one or more tables and/or figures among manuscripts submitted to a journal?
2. What is the relationship between the use of one or more tables and/or figures and select demographic characteristics (i.e., number of authors, number of manuscript pages, gender of the lead author, genre of manuscript) among manuscripts submitted to a journal?
3. What is the relationship between the use of one or more tables and/or figures and manuscript disposition among manuscripts submitted to a journal?

Method

Sample Size and Procedures

To analyze the prevalence and predictability of the use of visual displays among manuscripts submitted to a journal, we examined 71 manuscripts submitted to *RITS* over a 4-year period. These manuscripts represented approximately 50% of all manuscripts submitted to this journal over this time frame, which made these findings, at the very least, generalizable to the population of manuscripts submitted to *RITS*. The sample size of 71 was selected via an a priori statistical power analysis. Specifically, it represented the sample size needed to detect a moderate effect size (i.e., Cramer's $V = .3$) for a Type I to Type II ratio of 1 at the 5% level of statistical significance and a statistical power of .86 for a 2 (i.e., accept/revise-and-resubmit vs. reject) x 2 (use of at least one table or figure vs. non-use of any table or figure) contingency table.

For each of the 71 manuscripts submitted to *RITS* over this time period, we meticulously documented every table and figure presented by these 71 sets of authors. Further, we noted four demographic features of the manuscript (i.e., number of authors, number of manuscript pages, gender of lead author, genre of manuscript), as well as the disposition of the manuscript (i.e., accept/revise-and-resubmit vs. reject). As such, the data set created was both rich and unique.

Analysis

Descriptive statistics (i.e., measures of central tendency, measures of variation) were used to determine the prevalence rates of the use of tables and figures. Furthermore, a series of chi-square analyses was used to determine the importance of each of the selected variables on the quality of empirical manuscripts submitted to a journal for consideration for publication, as indicated by their eventual disposition (i.e., accept vs. revise and resubmit vs. reject). Additionally, independent samples *t* tests were used to compare the frequency of use of tables and figures, as well as the frequency of use of tables and figures as a function of the number of authors and the number of manuscript pages. Finally, a one-way analysis of variance (ANOVA) was used to compare the frequency of use of tables and figures as a function of genre of manuscript (quantitative research vs. qualitative research vs. mixed methods research vs. methodological/conceptual/theoretical).

Results

Quantitative Research Phase

Research Question 1: What is the prevalence of the use of one or more tables and/or figures among manuscripts submitted to a journal? Table 1 presents the percentages pertaining to the selected variables. In particular, it can be seen from this table that the majority (i.e., 80.3%) of manuscripts contained one or more visual displays. Interestingly, a statistically significantly (Fisher's Exact Test p value = .05) higher proportion of manuscripts contained tables (i.e., 75.3%) than figures (i.e., 41.1%), which represented a small-to-moderate effect size (Cramer's $V = .24$; cf. Cohen, 1988). The number of tables and figures combined in the set of 71 manuscripts ranged from 0 to 16 ($M = 3.58$, $SD = 3.09$). Further, the number of tables in the submitted manuscripts ranged from 0 (prevalence rate = 10.1%) to 11 ($M = 2.45$, $SD = 2.22$), whereas the number of figures in the submitted manuscripts ranged from 0 (prevalence rate = 24.0%) to 8 ($M = 1.12$, $SD = 1.76$). Consequently, on average, the number of tables was statistically significantly larger than was the number

of figures, $t(69) = 4.47$, $p < .0001$. This difference represented a medium-to-large Cohen's (1988) *d* effect size of 0.66.

Research Question 2: What is the relationship between the use of one or more tables and/or figures and select demographic characteristics (i.e., number of authors, number of manuscript pages, gender of the lead author, genre of manuscript) among manuscripts submitted to a journal? An independent samples *t* test revealed no statistically significant difference in the frequency of use of tables and figures as a function of the number of authors (t[70] = 0.72, $p = .48$) or the number of manuscript pages (t[70] = 0.30, $p = .76$). Similarly, a chi-square analysis revealed no statistically significant difference in the frequency of use of tables and figures between manuscripts with women lead authors and manuscripts with men lead authors, $X^2(1) = 1.96$, $p = .16$. However, with respect to the genre of the manuscript, a statistically significant difference emerged in the frequency of use of tables and figures as a function of genre, $X^2(1) = 27.32$, $p < .0001$, with a large effect size (Cramer's $V = .62$; cf. Cohen, 1988). Specifically, quantitative research manuscripts (41.1%) had the highest proportion of tables and figures, followed by mixed methods research manuscripts (31.6%), with both qualitative research manuscripts (14.0%) and conceptual/theoretical manuscripts (5.3%) having a statistically significantly lower proportion of tables and figures. Additionally, a one-way ANOVA revealed a statistically significant main effect for genre of manuscript, $F(3, 67) = 11.15$, $p < .0001$, with a very large effect size ($\eta^2 = .33$). A post-hoc Scheffè test further revealed that qualitative research manuscripts ($M = 1.71$, $SD = 2.20$) contained statistically significantly fewer tables and figures than did both quantitative research manuscripts ($M = 4.90$, $SD = 3.49$; $t[44] = 3.39$, $p = .001$) and mixed methods research manuscripts ($M = 3.72$, $SD = 2.11$; $t[33] = 2.77$, $p = .009$), with very large effect sizes (Cohen's $d = 1.09$ and 0.93, respectively); also, quantitative research manuscripts contained statistically significantly less tables and figures than did conceptual/theoretical/methodological manuscripts ($M = 1.57$, $SD = 2.07$; $t[34] = 2.41$, $p = .022$; Cohen's $d = 1.16$), with a very large effect size. No other pairwise differences were statistically significant.

Table 1

Descriptive Statistics Pertaining to Selected Demographic Variables Among Manuscripts Submitted to Research in the Schools ($n = 71$)

Variable	%
Proportion of women lead authors	41.2
Proportion of quantitative research manuscripts	40.8
Proportion of qualitative research manuscripts	23.9
Proportion of mixed methods research manuscripts	25.4
Proportion of non-empirical research manuscripts	9.9
Proportion of accepted manuscripts	12.3
Proportion of first-round revise-and-resubmit manuscripts	27.4
Proportion of first-round rejected manuscripts	60.4
Proportion of first-round manuscripts that contain at least one table and/or figure	80.3

Research Question 3: What is the relationship between the use of one or more tables and/or figures and manuscript disposition among manuscripts submitted to a journal? A statistically significant relationship emerged between the use of one or more tables and/or figures and manuscript disposition among the 71 manuscripts. Specifically, manuscripts that received a decision of either accept or revise-and-resubmit (92.1%) were statistically significantly ($X^2(1) = 27.32$, $p < .0001$) more likely to contain one or more tables and/or figures than were manuscripts that received a decision of reject (66.7%). The Cramer's *V* effect size of .32, indicated a medium effect size (Cohen, 1988). Moreover, manuscripts that received a decision of either accept or revise-and-resubmit were 2.04 times (95% confidence interval = 1.33, 3.12) more likely to contain one or more tables and/or figures than were manuscripts that received a decision of reject.

Discussion

The present study is unique in at least two ways. First, it represents the first study to investigate the relationship between the frequency of visual displays and select demographic characteristics (i.e., number of authors, number of manuscript pages, gender of the lead author, genre of manuscript) among manuscripts submitted to a journal. Second, and most importantly, this study represents the first attempt to examine the relationship between the frequency of visual and manuscript disposition among manuscripts submitted to a journal.

The finding that 80.3% of manuscripts contained one or more visual displays appears to be an encouraging one. However, an important question that arises from this finding is what proportion of the approximately 20% of manuscripts that were devoid of visual displays would have benefitted from one or more tables and/or figures? Interestingly, on average, these authors were producing more than twice as many tables than figures. Although it is possible that this ratio is justified, it is more likely that, in the main, this ratio reflects an underuse of figures, especially bearing in mind that figures can take numerous forms, which, as identified by the authors of APA (2010), include the following:

> • Graphs [that] typically display the relationship between two quantitative indices or between a continuous quantitative variable (usually displayed as the y-axis) and groups of subjects displayed along the x-axis.
> • Charts [that] generally display nonquantitative information such as the flow of subjects through a process, for example, flow charts.
> • Maps [that] generally display spatial information.
> • Drawings [that] show information pictorially.
> • Photographs [that] contain direct visual representations of information. (APA, 2010, p. 151)

Therefore, we encourage authors always seriously to consider how the use of figures can enhance their manuscripts.

The finding that only 14% of qualitative research manuscripts included one or more tables or figures is even less than the prevalence rate of 27% reported by Verdinelli and Scagnoli (2013) for qualitative research articles published in three prestigious qualitative research journals (i.e., *Qualitative Health Research*, *Qualitative Inquiry*, and *Qualitative Research*) over a 3-year period (i.e., 2007-2009). Further, the finding that qualitative empirical research manuscripts yielded statistically significantly lower usage of tables and figures than did the other two genres of empirical research manuscripts suggests that, despite the recommendation by Onwuegbuzie and Dickinson (2008) more than a decade ago for increased use of visual displays, qualitative researchers still are lagging behind both quantitative researchers and mixed methods researchers. The use/non-use of visual displays in qualitative empirical research manuscripts is worthy of further investigation.

Further, the finding that quantitative empirical research manuscripts yielded higher usage of tables and figures than did mixed methods empirical research manuscripts—albeit not statistically significantly higher—bearing in mind the potential that mixed methods researchers have to create both crossover displays (Onwuegbuzie & Dickinson, 2008) and joint displays (Fetters et al., 2015; Guetterman et al., 2013) might suggest that mixed methods researchers who submit manuscript to *RITS* are not taking full advantage of either the 1+1=1 integration formula (cf. Onwuegbuzie, 2017a; Onwuegbuzie & Hitchcock, 2019) or the 1+1=3 integration formula (cf. Fetters & Freshwater, 2015). Thus, the use of visual displays in mixed methods empirical research manuscripts should be subject to future examinations.

The key finding in his study that manuscripts which received a decision of either accept or revise-

and-resubmit were statistically significantly and practically significantly more likely—approximately twice as likely, on average—to contain one or more tables and/or figures than were manuscripts that received a decision of reject, suggests that the use of tables and figures makes a difference to the appeal of a manuscript to reviewers and the editor. This appeal, in turn, leads to a favorable editor decision.

Onwuegbuzie and Daniel (2005) identified the importance of *writing with discipline* by determining that manuscripts submitted to *RITS* that are poorly written overall are approximately 12 times more likely to be rejected, on average, than are well-written manuscripts. The notion of writing with discipline refers to writing manuscripts that are intended to be submitted to a journal for review for possible publication which have minimal APA errors in the abstract (Hahs-Vaughn, Onwuegbuzie, Slate, & Frels, 2009) and the body of the manuscript (Onwuegbuzie & Combs, 2009; Onwuegbuzie, Combs, Slate, & Frels, 2010), as well as in the reference list (Onwuegbuzie, Combs, Frels, & Slate, 2011; Onwuegbuzie, Frels, Hwang, & Slate, 2013; Onwuegbuzie, Frels, et al., 2010; Onwuegbuzie, Hwang, Combs, & Slate, 2012; Onwuegbuzie, Hwang, Frels, & Slate, 2011; Onwuegbuzie, Waytowich, & Jiao, 2006; Waytowich, Onwuegbuzie, & Jiao, 2006) and table (Frels, Onwuegbuzie, & Slate, 2010a) sections of empirical and non-empirical (e.g., methodological, conceptual, theoretical) manuscripts; avoiding grammatical errors (Onwuegbuzie, 2017b); using appropriate verbs (Frels, Onwuegbuzie, & Slate, 2010b); using link words/phrases to connect sentences and paragraphs whenever possible (Onwuegbuzie, 2016); avoiding communication vagueness (Onwuegbuzie, 2018); and maximizing readability (Onwuegbuzie, Mallette, et al., 2013). The present study indicates that using visual displays represents another component of writing with discipline.

In conclusion, the present findings have provided evidence of the potentially important role that tables and figures play in both the reviewer recommendation and editor decision process. Indeed, regardless of whether the link between visual displays and manuscript disposition is causal in nature, it is difficult to argue that including visual displays in manuscripts is not a worthwhile goal. Moreover, it is likely that visual displays reduce communication vagueness, and communication vagueness recently has been linked to manuscript rejection (Onwuegbuzie, 2018). At the same time, it is likely that visual displays increase readability, with readability also being linked to manuscript rejection (Onwuegbuzie, Mallette, et al., 2013). Thus, communication vagueness and readability should be the subject of future research in the area of visual displays.

Notwithstanding, because the present findings are correlational, follow-up studies are needed, optimally using mixed research techniques (see, for e.g., Johnson & Onwuegbuzie, 2004; Johnson, Onwuegbuzie, & Turner, 2007; Tashakkori & Teddlie, 2010), to explore the causal nature of this relationship between the use of visual displays and overall quality of manuscript. In particular, qualitative research approaches could be used to examine the use of tables and figures among manuscripts that contain visual displays and to compare and to contrast these manuscripts with those that do not include any visual displays. Further, qualitative research approaches could be used to examine the comments made by reviewers and editors regarding the use and non-use of visual displays. Such research would help to elucidate further the role that tables and figures play in the review process.

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