TREND: A tool for rapid online research literature analysis and quantification

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The Research Explicator for oNline Databases (TREND) tool was developed out of a need to quantify large research literatures rapidly and objectively on the basis of online research database output. By parsing such output with TREND, a researcher can in minutes extract the most commonly cited articles, the most frequently published authors, a distribution of publication dates, and a variety of other information from a research literature several thousand articles in size. This tool thus enables an increase in productivity both for researchers venturing into new areas of interest and for advisors and instructors putting together core reading lists. The processing of citations from articles represents a unique challenge, however, because deviations from strict APA formatting cause problems that are sometimes difficult to correct mechanically. A case study of one particularly troublesome citation (Baron & Kenny, 1986) is presented. Usage and implications are discussed.

Identification of the most influential and important articles, theories, and persons in psychology has long been a struggle. Traditionally, this has been done through literature review. This qualitative approach is often a lengthy and time-consuming process and relies heavily on the expertise and opinion of the reviewer, as well as literature availability. The reviewer's own biases and heuristics, built up over a lifetime of research—although productive in an academic sense and useful for the development of theory—may in fact interfere with his or her ability to produce an impartial estimate of the state of a literature. Indeed, even two hypothetically equally expert reviewers may come to opposing summaries and conclusions using this method.

To combat this, methods for summarizing literature quantitatively have primarily been developed, at least in psychology, under the headings of validity generalization and meta-analysis. These techniques produce more precise estimates of parameters of interest by aggregating the results of all studies that have examined whatever parameter the meta-analyst is interested in (see Landy, 2003, for a review). Estimates from these techniques correct for many of the effects of sampling error, which is impossible with a single study. These techniques have been adopted to different extents by the various disciplines within psychology. In some areas, such as clinical psychology and industrial–organizational (I/O) psychology, these techniques have been readily integrated into the literatures, whereas in other areas they have not. Part of the reluctance stems from a limitation of meta-analysis that is somewhat addressed by traditional literature review: Meta-analysis is reliant entirely on the variety and quality of the available research literature, which, in turn, is reliant on the meta-analyst's ability to locate and identify articles, disserta-

tions, and other research that addresses the parameter he or she wants to examine. This is a daunting prospect, considering the hundreds of thousands of academic articles available and the relative obscurity of individual articles that should be included. A reviewer examining the literature qualitatively can “fill in the gaps,” so to speak, even without finding every article available on a given topic.

Initial Development

With this limitation of meta-analysis in mind, The Research Explicator for oNline Databases (TREND) software was originally developed. Its overall purpose was to process the results of a search in an online database, such as APA's PsycINFO, and produce simple quantitative summaries. So, for example, imagine a researcher interested in examining the meta-analytic relationship between intelligence and job performance. This researcher might first proceed by searching PsycINFO for “intelligence AND job performance,” which would produce a list of several hundred articles, some of which would likely be relevant to the research question. Unfortunately, such a search does not capture all articles relevant to the research question; for example, unpublished research, articles lacking the particular keywords that the search used, and a host of other factors might limit the usefulness of the produced list. TREND, however, extends the utility of this output by producing several rank-ordered lists based on prevalence in the literature, including most frequently appearing authors, APA categorization numbers, keywords, publication years, citations, and other information. Meta-analysts can then use this information for more targeted investigation; for example, it might be useful to have the names of the top 20 or 30 most prolific researchers of a topic in order

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Table 1
Top 10 Most Common Citations of Baron and Kenny (1986)

	Citation	Error Types	Cites	
			<i>n</i>	Percent
1	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173-1182.	0	132	30.5
2	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51, 1173-1182.	1	59	13.6
3	Baron, R. M., & Kenny, D. A. 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51: 1173-1182.	2	20	4.6
4	Baron, R. M., & Kenny, D. A. (1986). The moderator– <i>mediator distinction</i> in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173-1182.	1	12	2.8
5	Baron, R. M., & Kenny, D. A. 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51: 1173-1182.	1	11	2.5
6	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, <i>strategic and</i> statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173-1182.	1	10	2.3
7	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social <i>psychology</i> research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173-1182.	1	9	2.1
8	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: <i>conceptual</i> , strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173-1182.	1	6	1.4
9	Baron, R. M., & Kenny, D. A. 1986 “The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical <i>considerations</i> .” <i>Journal of Personality & Social Psychology</i> , 51: 1173-1182.	1	5	1.2
10	Baron, R. M., & Kenny, D. A. (1986). The moderator– <i>mediator distinction</i> in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51, 1173-1182.	2	4	0.9
10	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, <i>strategic and</i> statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51, 1173-1182.	2	4	0.9
10	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 6, 1173-1182.	1	4	0.9

Note—*N* = 433. All errors on this table are intentional. Only the first of these citations is correct. Errors are marked with italics.

to ask them for any unpublished research related to the research question that they might have, or to spot any articles highly cited by the literature of interest but not necessarily contained within it.

After I developed this software for this purpose and discussed it with several other researchers, it soon became apparent that there were many more possible uses for TREND besides as a supplement to meta-analytic procedures. Say, for example, a researcher was interested in investigating a new area of study with which she had little familiarity. As a first step, she could use the TREND software to identify the top 10 most frequently cited articles in that area, to give her a quick introduction to the most prevalent theories and articles in the field without facing the somewhat intimidating and potentially misleading task of identifying such information from whatever articles she happened to read first. Another possible application of the software is to easily track research trends across various subdisciplines and compare the most common topics of research from year to year. Although this would be pos-

sible with the tools available previously, the process would be slow and tedious. With the TREND software, data for an accurate, illustrative graph could be generated in a matter of minutes. One can even imagine a situation in which a lecturer was putting together a reading list of articles for a graduate-level course. Although the lecturer would undoubtedly be very familiar with the literature, it would be easy in the moment to forget one or two important articles and fail to assign them. Using TREND, this mistake could easily be avoided. Used with well-crafted search queries, TREND can clearly have many productive uses.

Response to Researcher Needs

The initial development of this software allowed for several pieces of information to be extracted simultaneously: authors, APA categorizations, keywords, publication years, citations, publication source, and publication type. Although this initial development of the software was fairly straightforward, it soon became apparent that quantifying citations was more complicated than was

Table 2
Types and Prevalence of Citation Errors Committed

Error Type	Most Common Example	No. of Cites	
		<i>n</i>	Percent
(None)	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173–1182.	132	N/A
Incorrect Conjunction	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51, 1173–1182.	148	49.2
Year Parentheses Not Used	Baron, R. M., & Kenny, D. A. 1986. The moderator–mediator variable distinction in social psychological research: <i>conceptual</i> , strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51, 1173–1182.	73	24.3
Punctuation or Spacing Errors	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, <i>strategic and</i> statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173–1182.	60	19.9
Capitalization Errors	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: <i>conceptual</i> , strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173–1182.	39	13.0
Words in Title Omitted	Baron, R. M., & Kenny, D. A. (1986). The moderator– <i>mediator distinction</i> in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173–1182.	31	10.3
Incorrect Volume Listed	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 6, 1173–1182.	28	9.3
Spelling Errors	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social <i>psychology</i> research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 51, 1173–1182.	19	6.3
Issue Listed	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51(6), 1173–1182.	17	5.6
Page Numbers Listed Incorrectly	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 53, 561–571.	14	4.7
Major Terms in Title Flipped	Baron, R. M., & Kenny, D. A. (1986). The <i>mediator–moderator</i> variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51, 1173–1182.	13	4.3
Date Listed at End	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality & Social Psychology</i> , 1986, 51, 1173–82.	8	2.7
Incorrect Journal Listed	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Applied Psychology</i> , 51, 1173–1182.	7	2.3
Subtitle Not Included	Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological <i>research</i> . <i>Journal of Personality & Social Psychology</i> , 51, 1173–82.	4	1.3
Author Listed Incorrectly	<i>Baron, R. H.</i> , & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. <i>Journal of Personality and Social Psychology</i> , 51, 1173–1182.	3	1.0

Note—Italics added to indicate area where error of focus occurred. All examples are actually drawn from the citations lists and thus may contain more than one error. Percentages indicate the percentage of those citations that contain errors ($N = 301$).

initially hoped. Article writers are of course human, and journals differ in their standards for printing citations. Together, these factors create a large problem for automated quantification software. Originally, TREND extracted a list of every article cited within a research literature and then matched each citation on a letter-by-letter basis in order to count appearances of the same article. This produced inaccurate results when citations differed in form by even a small amount.

I discovered this problem while trying to determine the articles most cited by the I/O psychology literature between 2001 and 2005. The single most cited article in

that literature is Baron and Kenny (1986). This is unsurprising, given the content of that article: It gives a clear and comprehensive description of the differences between moderators and mediators and how to test for them, which is a common type of analysis in the I/O literature. The article is also highly cited in general. As of the time of this writing, according to the Social Science Citation Index (SSCI), a part of ISI Web of Science, this article has been cited a total of 8,649 times across disciplines. The correct citation for this article appears in Tables 1 and 2 as Citation 1. Unfortunately, this is a relatively uncommon way for this citation to appear. Out of 433 citations

referenced within PsycINFO (see the Method section for details on the extraction procedure) and located manually in the list produced by TREND, only 132 (30.5%) are formed like this. Thus, with the original configuration of the software, researchers would have extracted separate entries for each of the citations listed in Table 1. In order to investigate the extent to which TREND could be reconfigured to correct for such errors, I took a deeper look at the Baron and Kenny article within the recent I/O literature, and I present the following case study based on those findings.

METHOD

A search was run in APA's PsycINFO under OVID's interface for each of the top 10 journals in I/O psychology (Zickar & Highhouse, 2001) linked together with OR terms. This was in turn connected with an AND term to "2001.yr OR 2002.yr OR 2003.yr OR 2004.yr OR 2005.yr," which produced a database of 199,068 distinct citation patterns (each of the rows in Table 1 would be considered a distinct pattern) harvested from 265,659 total citations, indicating an average of 1.33 citations per pattern. This database thus contained every citation made by every article published within I/O psychology's top 10 journals for this five-year period, as indexed by PsycINFO. Next, this list was sorted alphabetically and all citations appearing to reference Baron and Kenny (1986) were extracted by a visual check of all citations starting with "B."

RESULTS

The resulting database contained 135 unique citation patterns all referencing the same article. I coded each article in this list for errors. To do this, I visually checked the first citation in the list for errors, and determined categories for those errors. I then coded the second citation for the errors extracted from the first, and conducted a visual check and categorization as before. This process was continued for all 135 patterns, resulting in 14 error types, which are summarized with examples in Table 2.

It should be noted here that "error" refers to any deviation from a prototype citation and not necessarily to a mistake made by the author or editor. In the present example, the prototype "error-free" citation is derived from strict APA formatting. If the literature had contained articles written primarily in another style, the "error-free" version would be in that style. The extent to which the errors in the present investigation are due to author, editor, journal guidelines, or other forces is unknown and outside the scope of this article. It should also be noted that italics or underlines are missing from PsycINFO and are thus ignored in this analysis.

Although Table 2 provides evidence of a large number of errors being committed, there is some overlap between citations. To investigate the extent of error overlap, a bar chart examining the extent of errors appears as Figure 1. A positively skewed distribution results, with a mean of 1.07 errors and a median of 1.00 errors, with no citation containing more than 4 of the 14 errors. This indicates that

Figure 1. Bar graph of number of articles split by number of formatting errors committed.

most articles have relatively few of the types of errors presented in Table 2, although more articles contain a citation with an error than do not.

DISCUSSION

The majority of errors committed here are of an automatically correctable fashion. These are, in a sense, systematic errors that can be anticipated. The most common error, for example, is the replacement of the ampersand with the word "and." An option was added into TREND to correct for this by searching the citation string and removing "and" and "&" from the searchable terms. In other words, both "Journal of Personality and Social Psychology" and "Journal of Personality & Social Psychology" would be checked as "Journal of Personality Social Psychology." If this was the only difference between two citations, they would be grouped as one citation pattern by the software.

Similar accommodations have been added for each of the remaining errors, when possible. See the Appendix for a complete listing of each error and the technique included in TREND to address it.

Critical Considerations

As should be apparent to the reader by now, there are many possible errors and many correction options available to address them. For an illustration of how different the comparison string can become once corrections are applied, consider again the citation of Baron and Kenny (1986), which appears again below. When put through TREND with maximum corrections (labeled as "Liberal Assumptions," in the software), the citation undergoes the following transformation:

Original citation. Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality & Social Psychology*, 51, 1173-1182.

Figure 2. Screen shot of the TREND software, version 1.21.

Citation treated by assumptions. baronkennymod
eratormediatorvaridistinctionsocialpsychologresearch
journalpersonalsocialpsycholog

Use of this method is a double-edged sword. On the one hand, it allows for a great reduction in the number of citation patterns extracted, because the core information for comparison remains in the treated pattern. In the data set examined earlier, the 135 unique citation patterns reduce to 4 unique citation patterns, producing a much more accurate estimate of the number of Baron and Kenny (1986) cites. On the other hand, increased power to match citations also means an increased number of false positives—that is, citations that should not be considered the same are more likely to be considered the same by the software. It is up to the researcher using TREND to judge the state of his or her own literature and decide which assumptions are appropriate. Fewer assumptions result in fewer errors but more by-hand work to correct for it. TREND can output all citations extracted (when “No Assumptions” is selected), allowing for a full by-hand check of the data. It is because of this that I do not recommend using the TREND software to produce definitive, absolute counts of citations. Much like SSCI, TREND is limited to some extent by the way the original citations were written. For less critical purposes, such as devising class or personal reading lists, or comparing relative position of importance, it remains invaluable.

Recommended Usage of TREND

The following is a recommended procedure for using the TREND software. It is by no means definitive, but

instead represents a standard and effective procedure for obtaining the desired results.

Step 1. Search the research literature and download or create a single output list containing all of the citation data from the area of interest. For more detail on this step, see Landers (2007).

Step 2. Input this list into TREND by clicking on the Browse button and selecting it (see the software interface in Figure 2).

Step 3. Select the checkboxes to indicate which output is desired (Authors, Areas of Study, Parent Publication, Year of Publication, Type of Publication, Citations, and Keywords).

Step 4. If Citations output was selected, open the Options menu and select which Assumptions are appropriate to the data. “Moderate Assumptions” should be appropriate for most searches, but this decision will depend on the researcher’s beliefs about the literature he or she is examining.

Step 5. Run the software. For small literatures (under 500 articles), this should take less than 2 min. The process time for this software is exponential—that is, the increase in processing time required per article increases as more articles are entered into TREND’s working database. The first few articles will be processed in a fraction of a second each, whereas the articles around the 1,000th may take up to 2 sec each, depending on the speed of the computer.

Step 6. Examine the output. If you are exporting to Excel or MySQL, sort functions will be available, which will make this task much easier.

Table 3
Example Uses of TREND Functions

Function	Questions Addressed
Authors	Which authors are most prolific within this literature?
Areas of Study	In which APA category does most of this research fall? In which APA category does this author most often publish?
Parent Publication	Which journals publish on this topic the most often? Which books examine this topic the most consistently?
Year	How has the study of this topic changed over time? How has this author's publication rate changed over time?
Type of Publication	Is publication in journals, books, or dissertations more common for this topic?
Citations	Which articles/authors are most cited by this literature? What are the most important/influential articles/authors within this literature?
Keywords	What key ideas are most often contained within this literature?
Combination of Functions	Which authors most often cite this article?

Step 7. Draw conclusions about the state of the literature based only on large discrepancies, and as appropriate to the assumptions used. Although a difference of 20 citations may be a clear difference between the relative importance of two articles, a difference of a single citation is much more difficult to interpret.

Overall Contribution of This Software

SSCI, arguably the most powerful research trend tracker currently available, can be used for two major purposes: to track individual article citations over time and to examine overall trends in the entire research literature across disciplines. Its weakness, then, is that this specificity cannot be altered. SSCI primarily operates either at the specific-article level or the entire-research-literature level. The TREND software offers all of the power of SSCI but expands usability by using custom data-aggregation techniques specified by the researcher, which allows for targeted investigations of research literatures not previously possible with any software publicly available. The wide array of options in citation processing further allows customized investigations of a wide variety of questions. Using well-crafted database queries with the TREND software, a wide variety of questions can be addressed, a few examples of which appear in Table 3.

It should not be concluded from this article that TREND is fully superior to or intended to replace ISI Web of Science's SSCI. SSCI remains a more powerful and much faster way to gather summary information about individual articles or research topics across all of academia that it indexes. For example, if a researcher wants to know how many times a particular article has been cited across the social sciences, SSCI is the best option. In contrast, if a researcher wants to know how many times that article has been cited within a particular PsycINFO search, this is a task for TREND. Also, because ISI possesses dedicated databases and servers for the parsing of reference data, if an analytic task is possible with both SSCI and TREND, SSCI is preferable. Because TREND runs on the user's computer, it is by nature limited by the computing power available to the researcher.

As pointed out by a reviewer, there are also a number of specific analytic summaries available within the SSCI

Citation Report tool that are technically unavailable in TREND, although their results can be duplicated. The h-index, for example, serves as a sort of impact factor, indicating how many articles have that same number of citations or more (e.g., an h-index of 6 indicates that six articles have been cited at least six times). This index can be determined easily by taking the citation list outputted by TREND, sorting it by descending number of citations, and finding where the number of citations drops below the row number. The other indexes produced, such as Results Found, Sum of the Times Cited, and Average Citations per Item, can all be determined through simple algebra. Year-by-year breakdowns could be determined by running several searches through TREND separately. A graph depicting Published Items in Each Year could be created from TREND's Year output alone.

In summary, TREND offers a free, new, and more powerful way to examine a research literature, without the limitations of or likelihood of error using the old "by-hand" methods. It offers a wide range of customizable options for searching and extracting quantitative information from a research literature. It can currently be run in Windows XP or higher and downloaded from rlanders.filedrawer.org/explicator.html.

AUTHOR NOTE

This article is based on a paper presented at the 2007 Conference of the Society for Computers in Psychology, where it won the Castellan Award for outstanding student paper at the conference. The author thanks the Society for this honor. The author also thanks Robert Proctor and two anonymous reviewers for their comments on the manuscript and gives special thanks to Paul R. Sackett for his early comments, encouragement, and guidance. Correspondence concerning this article should be addressed to R. N. Landers, Psychology Department, N218 Elliott Hall, 75 East River Road, University of Minnesota, Minneapolis, MN 55455 (e-mail: rlanders@umn.edu).

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APPENDIX

List of Errors and Techniques to Address Them

Error 1: Incorrect Conjugation

The most common error is the replacement of the ampersand with the word "and." An option was added into TREND to correct for this by searching the citation string and removing "and" and "&" from the searchable terms. In other words, both "Journal of Personality and Social Psychology" and "Journal of Personality & Social Psychology" would be checked as "Journal of Personality Social Psychology." If this was the only difference between two citations, they would be grouped as one citation pattern by the software. This is done automatically by TREND.

Error 2: Year Parentheses Not Used

The second most common error, the placement of parentheses around the year, is corrected by the automatic elimination of all special characters by TREND.

Error 3: Punctuation or Spacing Errors

The third most common error, involving punctuation and spacing, is corrected by the automatic elimination of all punctuation and special characters by TREND.

Error 4: Capitalization Errors

The fourth most common error, incorrect capitalization, can now be corrected by the automatic conversion of all citations to lowercase. This is done by selecting the "Ignore Case" option in TREND.

Error 5: Words in Title Omitted

The fifth most common error, the omission of words in the title, is one of the trickiest to correct for, considering how widely citations can vary. Baron and Kenny (1986), after all, is only a single case study. Other citations may have widely differing commonly ignored words. To partially address this, the TREND software contains the ability to remove any particular word of concern, by selecting the "Eliminate Specific Text" option. This will remove a word of the user's choice from all citations. This solution is problematic, however; the only way a researcher would know that such a word existed would be by running the software without such a check first. If better solutions are discovered to address this problem, they will be implemented in later versions of TREND. As it stands, this is a type of unsystematic error, which makes it impossible for the software to identify it automatically.

Error 6: Incorrect Volume Listed

The sixth most common error, the incorrect listing of volume, can be addressed easily by removing all numbers from the citation, using the option to "Eliminate Numbers" in the TREND software.

Error 7: Spelling Errors

The seventh most common error, incorrect spelling, is partially corrected by the option to remove commonly confused endings, including -ical, -ites, -gy, and -s. This can be done through the "Eliminate Commonly Confused Suffixes" option. It can also be used in conjunction with the "Eliminate Specific Text" option, detailed above, to eliminate particular misspellings that might often occur in a literature.

Error 8: Issue Listed

The eighth most common error, the listing of the issue, is a difficult one to tackle. According to APA guidelines, the issue should be included in the citation if the journal is repaginated on an issue-by-issue basis. *The Journal of Personality & Social Psychology* orders its pages by volume, so this is unnecessary. This implies that any particular journal may have different requirements for the presentation of issue. The easiest workaround here is to eliminate the issue entirely, by using a combination of the automatic function to eliminate special characters (such as parentheses) and the option to "Eliminate Numbers." This removes the issue entirely from the comparison pattern.

Error 9: Page Numbers Listed Incorrectly

The ninth most common error, incorrect page numbers listed, can also be corrected using the "Eliminate Numbers" option. If the pages are not present in the comparison pattern, there is no way they could be confused.

Error 10: Major Terms in Title Flipped

The 10th most common error is specific to this particular article title. It involves the reversing of the terms "moderator" and "mediator" in the article title. Because this sort of error would occur on an article-by-article basis, it is impossible to correct using the TREND software.

APPENDIX (Continued)

Error 11: Date Listed at End

The 11th most common error, the listing of the date late in the citation, like several earlier errors, can be corrected using the “Eliminate Numbers” option.

Error 12: Incorrect Journal Listed

The 12th most common error, the listing of the incorrect journal name, causes trouble in much the same way as the flipping of terms in the title. This cannot be corrected by the TREND software, because it is an unpredictable error.

Error 13: Subtitle Not Included

The 13th most common error, the inclusion of a subtitle, can be corrected using the “Eliminate Subtitles Starting With a Colon” option. This removes all text following any colon until the following period. This effectively removes subtitles and compares the remaining text; for example, “The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations” would be compared as “The moderator–mediator variable distinction in social psychological research.” Thus, whether or not the original author included the subtitle is irrelevant, because it will not be used in the comparison pattern.

Error 14: Author Listed Incorrectly

The 14th most common error, the incorrect listing of the author, is a tricky one. Although completely incorrect spellings of the author’s name (e.g., “Kenney”) cannot be checked, because they vary from article to article, initials are another matter. By using the option “Eliminate Words Less Than 3 Characters,” all initials (e.g., “R.” or “D.”) would be eliminated from the comparison pattern.

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