

Authorship trends in the *Journal of Applied Behavior Analysis*: An update

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The *Journal of Applied Behavior Analysis (JABA)* is considered the flagship journal for the discipline of applied behavior analysis. Thus, popular research topics and other publication trends within *JABA* reflect the current cultural and scientific contingencies governing the field of behavior analysis. Researchers have previously quantified a number of authorship trends in *JABA* (and other behavior-analytic journals) across a number of variables, such as gender identity and sex of author, country of origin, or seniority within the field (Dunlap et al., 1998) to examine demographic and organizational factors associated with successful publication in *JABA*. These analyses ought to be conducted continuously to monitor trends and detect any potential biases (e.g., sexism). Accordingly, the purpose of the present investigation was to replicate previous research in this area (e.g., Dymond et al., 2000) and provide an update of current publication trends within *JABA*. Implications for future research and publishing practices are discussed.

Key words: authorship, women, men, publication history, seniority

Science is a cultural practice and is governed by cultural contingencies (Skinner, 1981). A major aspect of any science is dissemination, and in particular, publishing. Publications are a permanent product of molar units of behavior (i.e., research and writing) which we regard as integral to science broadly and behavior analysis specifically. Contingencies that govern having an article (a specific unit of verbal behavior) accepted for publication are intended to be salient to the submitting author (e.g., publication guidelines, editorial commentaries). However, just as the behavior of the scientist is the product of that scientist's history (Skinner, 1956), the behavior of the reviewers and editors is the product of their history (Budden et al., 2008; Lloyd, 1990). As such, inappropriate

biases (e.g., racism, sexism; tacted or untacted) held by reviewers and editors corrupt the cultural contingencies of a science, despite the presence of objective journal guidelines, aims, and scopes. These biases are also manifest in the underrepresentation of certain groups in various majors (e.g., women in STEM; Ceci et al., 2014) and gender-based pay gaps (Li et al., 2019). Thus, these biases can be detrimental to the advancement of researchers and the field at large.

The impact of these biases can be local and global. Article authorship (e.g., number of authors, number of new authors, authorship order) is an important publication parameter and productivity metric for faculty and researchers. For junior researchers, well-established publication track records (number of total publications, number of first-author publications) largely factor in hiring decisions for many academic positions (Siow, 1998). Once hired, tenure and promotion are often predicated on publication achievements

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(Park & Gordon, 1996). Also, publication record is one factor in acquiring extramural research funding (e.g., “investigators” score; National Institutes of Health [NIH], n. d.). Lastly, these biases can also limit what is known scientifically and the types of questions that are asked, as diverse research teams may produce more diverse outcomes (e.g., Disis & Slattery, 2010).

From this perspective, publication trends are important because they may provide descriptive evidence on the presence of inappropriate biases. Thus, publication trends ought to be evaluated and reevaluated in a continuous manner in order to adjudge the overall health of the cultural contingencies of a science. Accordingly, researchers have systematically and quantifiably analyzed a number of publication dimensions to detect and describe various trends in behavior analysis (Carr & Briggs, 2011; Hayes et al., 1980; Northup et al., 1993).

The *Journal of Applied Behavior Analysis (JABA)* has been considered the flagship journal for the discipline of applied behavior analysis (e.g., Elliot et al., 2005; Rehfeldt, 2011). As such, *JABA* best describes issues relevant to the current state of the field and its current philosophical zeitgeist. Therefore, authorship trends in this journal (and the detection of biases therein) are particularly relevant to the current cultural contingencies governing the discipline of applied behavior analysis. As such, researchers have evaluated authorship trends in *JABA* including percentage of articles authored by new or veteran authors, as well as authorship demographics (e.g., gender; Dunlap et al., 1998; Dymond et al., 2000; Li et al., 2018; Matthews, 1997).

Dunlap et al. (1998) and Dymond et al. (2000) both assessed the number of *JABA* articles with new authors (defined as having no publications in *JABA* within the previous 5 years) versus veteran authors (defined as having a publication in *JABA* within the previous 5 years) from 1975 to 1995 and 1975 to 1999, respectively. In particular, Dymond et al. examined new versus veteran *first* authors, whereas Dunlap et al. examined

authors regardless of order. Both Dymond et al. and Dunlap et al. found a decreasing trend in publications with new authors and a corresponding increasing trend in publications with veteran authors. These results are concerning for several reasons. First, although the number of Board Certified Behavior Analysts (BCBAs) is at an all-time high (39329, Behavior Analyst Certification Board [BACB], n. d.), the majority of BCBAs do *not* engage in research (BACB, n. d.; Cicoria, 2019). In a recent survey, the BACB found that, of respondents, only 2% of BCBAs reported engaging in university teaching or research. Even among faculty within behavior-analytic graduate programs, many faculty members do not publish extensively, and a small number of institutions produce a disproportionate number of published articles (see Dixon et al., 2015). Together, these numbers imply that only a handful of individuals are currently publishing. Secondly, of the 287 manuscripts submitted to *JABA* for potential publication in 2018, only 38.3% of those submissions reached publication (A. Simpson, personal communication, December 30, 2019). Thus, only a small subgroup of behavior analysts is submitting manuscripts for publication, and among this group only a small fraction is successfully publishing within our flagship journal. It is plausible that this small group of successful researchers is disproportionately composed of veteran researchers. It may be more difficult for new authors to publish in *JABA* relative to veteran authors (Cicoria, 2019), though this issue warrants systematic examination. The fact that only a small fraction of researchers is successfully publishing can limit what is known scientifically, the range of empirical questions being asked, and the diversity of outcomes (Disis & Slattery, 2010). Moreover, the preponderance of veteran authors that comprise the subset of successfully publishing researchers can inhibit the ability of junior researchers and faculty to build and establish publication track records necessary for obtaining employment (Siow, 1998), and to be competitive

for extramural funding (NIH, n. d.). Third, many veteran authors are retiring (Cicoria, 2018), meaning that new researchers will be called upon to fill the void left by aging and/or retiring authors. Along with new or veteran status of authors, other variables (e.g., sex) are also important to consider.

In addition, Li et al. (2018) recently found that the majority (i.e., 60%) of first authors of *JABA* manuscripts are women. Given that the field of behavior analysis is seeking to increase its representation and inclusion of women and individuals from diverse backgrounds (e.g., Women in Behavior Analysis [WIBA] Conference; *Behavior Analysis in Practice (BAP)* 2019 Special Issue on Diversity and Equity in the Practice of Behavior Analysis), these findings are encouraging. The findings also highlight the importance of systematically examining authorship trends in behavior-analytic journals, as such examinations would enable detection of possible degradation of or deleterious cultural contingencies related to publishing.

Both Dunlap et al.'s (1998) and Dymond et al.'s (2000) findings raise questions regarding the current state of representation of junior authors. On the contrary, Li et al. (2018) promisingly found an increased representation of women as of late. In addition, it is in the best interest of a science to continuously monitor publication trends to identify biases that could corrupt its cultural contingencies. It has been two decades since *JABA* authorship trends have been analyzed regarding veteran and junior authors. Thus, the purpose of the current investigation was to replicate and extend procedures and findings from Dunlap et al., Dymond et al., and Li et al. by examining the trends in *JABA* authorship across the past 20 years.

Method

All articles published in *JABA* from 1999 (i.e., since Dymond et al.'s, 2000, analysis) through the time of the search (November

2019)—including those published only online (i.e., “early view”)—were examined. All articles were entered into a spreadsheet (Microsoft Excel, 2016) that included the article's title, year of publication, and name and rank (i.e., first, second, etc.) of each author. When possible, each volume was independently reviewed by the first and second authors and compared to their respective online record to ensure accuracy of descriptive information. Agreement was 100% for all articles.

New Versus Veteran Authors

First, we examined the percentage of *JABA* articles per year published by new or veteran authors. New and veteran authors were defined in the same manner as previous investigations (e.g., Dunlap et al., 1998; Dymond et al., 2000). New authors were individuals that had not previously published in *JABA* within the previous 5 years. Veteran authors were individuals that had published in *JABA* within the previous 5 years. Next, we replicated this procedure with one exception: only first authors were examined rather than all authors. All analyses and figures were generated using a combination of Python 3.8.0 (Python Software Foundation, 2020) and Microsoft Excel (Microsoft Corporation, 2016).

Women and Men as First, Second, and Last Author

We also evaluated the percentage of women and men as first and senior author from 2014 through November 2019, using procedures identical to Li et al. (2018). Similar to the previous study, we reviewed each article and recorded if the first, second, and last author was a woman or a man on the basis of their first names. If this procedure did not allow for an author to be classified, a Google search was conducted using the author's full name in sources including university and professional (e.g., LinkedIn, ResearchGate, Google Scholar

profiles) websites and conference speaker biographies. This procedure allowed for all authors to be classified based on pronouns used in these sources. Second and last author were chosen as our metrics to indicate senior authors for two reasons: (1) to remain consistent with previous investigations (i.e., Li et al.), and (2) senior academics are frequently listed last to reflect seniority, prestige, and provision of guidance over a project (Igou & van Tilburg, 2015), or principal investigators will often list themselves as second author (Li et al.). We independently analyzed volumes, compared results, and obtained 100% interobserver agreement.

Results and Discussion

Figure 1 depicts the percentage of *JABA* articles per year that include new and veteran authors, regardless of author position (primary y-axis), and total number of new and veteran authors, regardless of position (secondary y-axis). The median percentage of articles per year with new authors was 57% (range, 46–66%) and 43% (range, 34–54%) for veteran authors. The median number of new and veteran authors per year was 115 (range, 60–238) and 84 (range, 60–161), respectively.

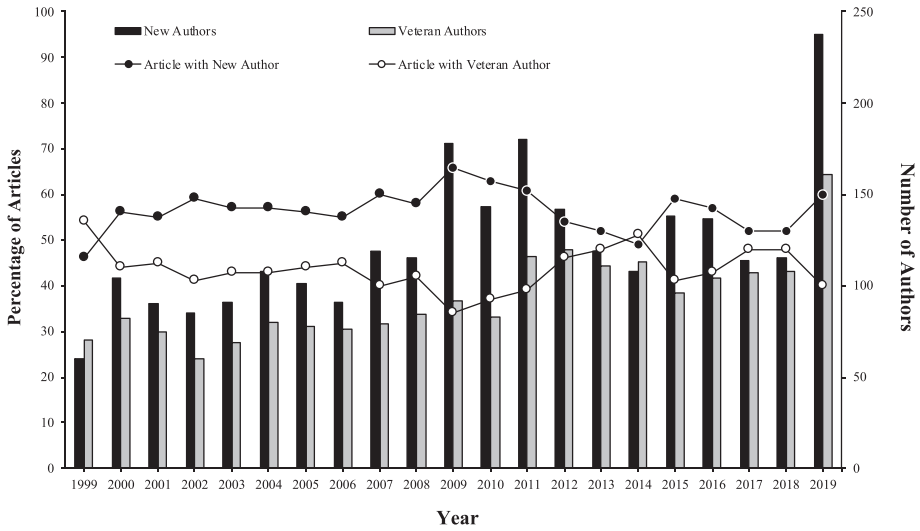
Figure 2 shows the percentage of *JABA* articles per year authored by new and veteran first authors (primary y-axis) and total number of new and veteran first authors per year (secondary y-axis). The median percentage of articles per year with new first authors was 51% (range, 33–64%) and 49% (range, 37–67%) for veteran first authors. The median number of new and veteran first authors per year was 34 (range, 17–87) and 35 (range, 24–52), respectively.

Figure 3 depicts the percentage of articles per year with women and men as first (top panel), second (middle panel), and last author (bottom panel) from 1999 to November 2019. The median percentage of articles with women as first author was 55% (range, 27–76%) and 45% (range, 24–73%) with men as first author.

The median percentage of articles with women and men as second author were 42% (range, 25–63%) and 58% (range, 37–75%), respectively. The median percentage of articles with women as last author was 49% (range, 42–71%) and 51% (range, 29–60%) with men as last author.

Both Dunlap et al. (1998) and Dymond et al. (2000) found decreasing trends of publications with new first authors (e.g., as low as 10% in 1996; Dunlap et al.). In contrast, we found that, from 1999 to November 2019, there were increases in the percentage of articles that included new authors regardless of order, in new first authors that had not published within the previous 5 years, and in total number of new authors each year. Our data show that there is no longer a decreasing trend for publications by new authors. Rather, there is a balance between new and veteran authors in *JABA*, such that new authors constitute a larger proportion of all authors in recent *JABA* issues relative to previous years. For example, the median percentage of articles per year with new and veteran first authors is 57% and 43%, respectively. These trends also appear to be very stable across the past two decades, with a higher level than those of previous analyses (Dunlap et al.; Dymond et al.). Indeed, our results are encouraging, in that the verbal behavior of new authors is often contacting the presumed reinforcer (publication). As the number of individuals engaging in research (e.g., graduate students completing theses or dissertations, junior researchers, and/or faculty members) is growing, it is reassuring to see up-and-coming researchers publishing in the field's flagship journal. Moreover, the difference between previous findings and those of the current investigation supports the importance of analyzing authorship trends, as well as editorial and reviewer practices. That is, a bias clearly existed, but can no longer be detected.

Figure 1
Articles Authored by and Number of New and Veteran Authors per Year



Our data also show a clear, recent preponderance of women as first authors, especially within the past decade. In 2019 alone, 70% of first authors were women. In agreement with previous findings, women are certainly making substantial contributions to the field. With regard to senior authors, the contrast between

women and men as senior author is not as pronounced. However, for four out of the six most recent years analyzed, a greater percentage of women were listed as senior authors. Further, publications with women as the senior author have recently become more likely than publications with men as the senior author. That is, a

Figure 2
Articles Authored by and Number of New and Veteran First Authors per Year

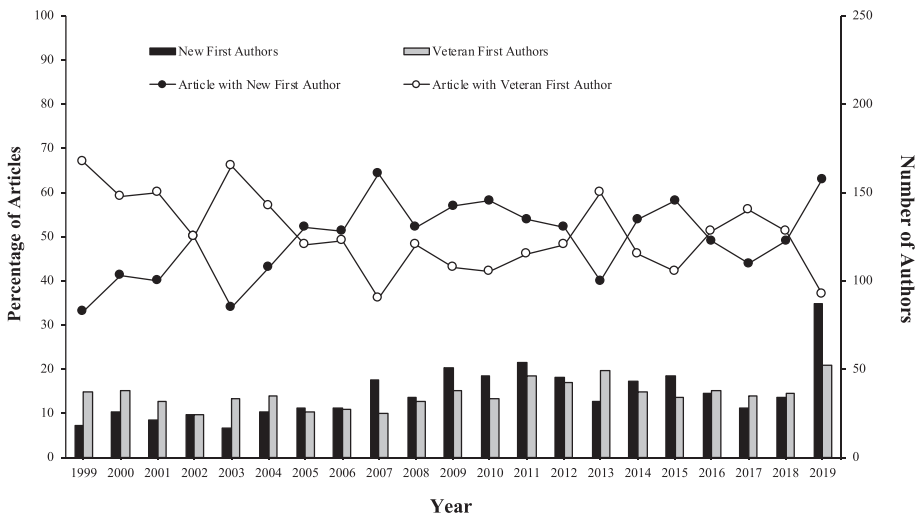
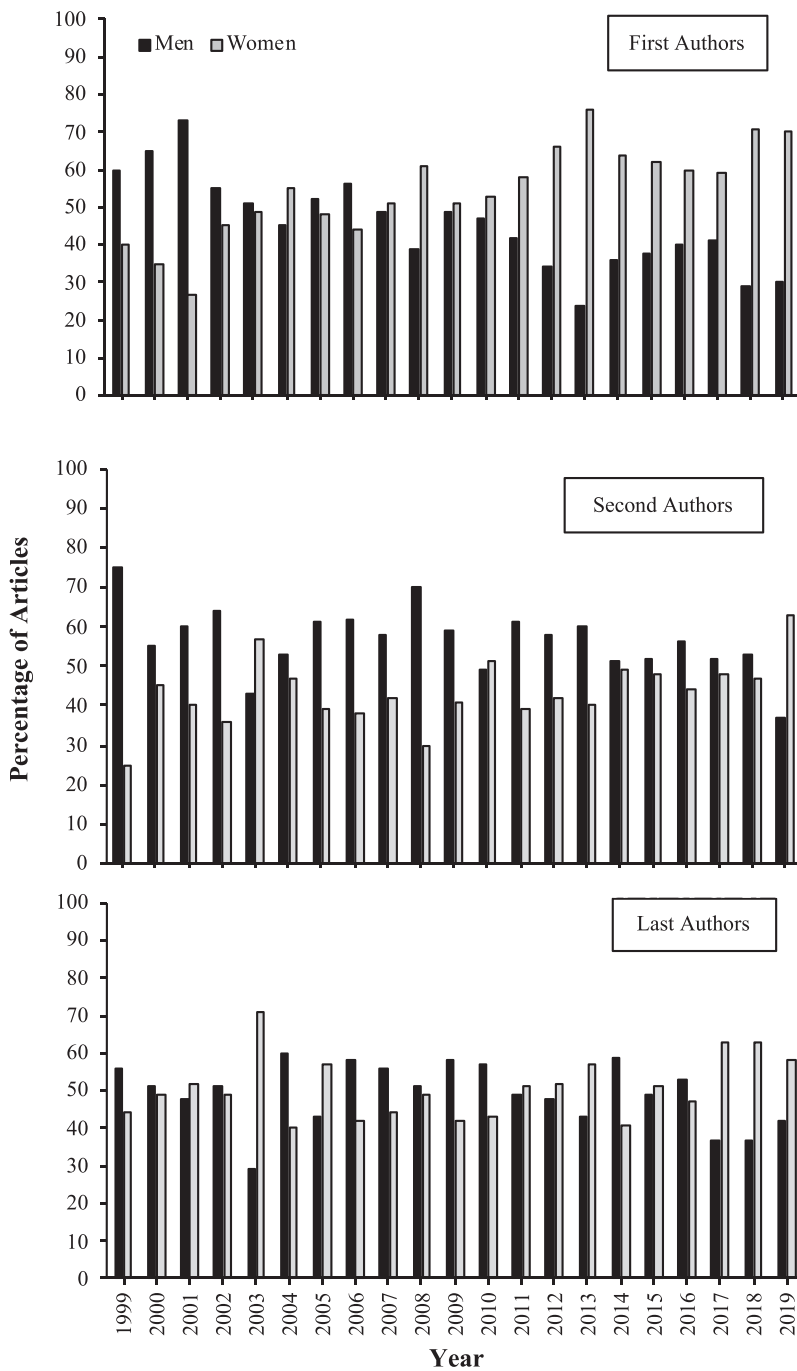


Figure 3
Percentage of Articles with Women and Men as First, Second, and Last Author



shift in the proportion of women authors was observed relative to preceding years for both second and last author, in that a greater proportion of women were second and last author between 2017 – 2019.

Together with our analyses of new and veteran authors, these data also indicate that no intersecting biases between new and veteran, and women and men are currently detectable. That said, our results may not be representative of the total number of women attempting to publish. As such, it may be worthwhile to conduct similar analyses on the total number of manuscripts submitted for potential publication that do not reach acceptance. That is, it is currently unknown whether the base rate of submissions is greater for women authors, and thus the bias was simply undetected in the current analysis. Analyses of rejected manuscripts would permit a more encompassing statement regarding publication trends and potential biases. Put another way, the current results suggest that women are well-represented as authors in *JABA*; however, it remains unknown if they are proportionally represented.

As Dunlap et al. (1998) stated, interpretation of these types of data can be difficult. They were specifically concerned that the content of publications may shift to areas that favor certain interests, methodologies, or even laboratories. This type of shift may favor a particular type of researcher's work being published. Our data suggest that, over the past two decades, *JABA* has been inclusive of both up-and-coming researchers and veteran contributors who are well-established in the field. Moreover, women appear to be well-represented among the journal's pages, rightfully highlighting their meaningful contributions.

It is difficult to identify with certainty the cause(s) of increased representation of women and junior authors. Perhaps women academics in "younger cohorts" (i.e., ages 25–34 and 35–44; see Nosik et al., 2019) are successfully

publishing more frequently and are beginning to represent a greater proportion of behavior-analytic faculty and researchers. If this is the case, it would be surprising, and indeed concerning, if there was not a strong presence of women in article authorship. It is also plausible that advisors and mentors are strongly encouraging and grooming their students and mentees to publish during students' training, even if students are focused largely on pursuing a career as a practitioner.¹ As the number of BCBA's is at an all-time high (BACB, n. d.), it can be inferred that the number of students in behavior-analytic programs is also at an all-time high. Therefore, a greater number of students may be contributing to research in ways that warrant authorship. It would also be remiss to overlook the formation of the WIBA Conference (Sundberg et al., 2019) as a potential contributing variable. Whatever the reason(s) may be, the current authorship parity is encouraging and promising for both *JABA* and the field at large.

Authorship order and the frequency with which individuals are publishing are two metrics to evaluate publication trends within *JABA*. A noteworthy extension of this work, as suggested by Dunlap et al. (1998), may be to analyze the extent to which certain authors are publishing with each other, across institutional affiliations, and across junior–senior author affiliations. Additionally, the current data are obtained from only published articles. It may be of interest to know the extent to which both new and veteran authors are receiving rejections. Similarly, it may prove fruitful to analyze if there are any relations between new and veteran, and women and men as authors. It may also be interesting to quantify the degree to

¹That is not to say that advisors and mentors were not previously encouraging students to publish, but rather students who may not have previously considered publishing their work are now doing so more frequently; and, that those students' submissions are oftentimes of the quality deemed necessary to be accepted for publication.

which new authors belong to the same research networks as veteran authors (e.g., same graduate programs, shared relationships to faculty mentors, affiliations with other authors, etc.). Finally, analysis of the composition of review panels may be of additional interest. Research outside of behavior analysis suggests reviewer gender may influence article acceptance (Lloyd, 1990) and the content of accepted articles (Budden et al., 2008). Therefore, reviewers should be selected with care (Kotsis & Chung, 2014) and it may be worthwhile for editorial boards to conduct analyses on reviewers selected (Tuckett & Kangasniemi, 2017). These analyses may be of particular interest for *JABA*, as submitting authors are not automatically blinded. That is, unless the authors request blind review, editors and reviewers are able to identify author names on a manuscript submitted for potential publication. Reviewers, however, remain anonymous to those same authors (i.e., single-blind review). Research outside of behavior analysis also, unfortunately, indicates single-blind review tends to favor well-known authors and those from high-prestige institutions (Tomkins et al., 2017). Currently, authors have the option to request a double-blind peer review (i.e., both reviewers and authors remain anonymous to each other) when submitting to *JABA*, but most do not (Cicoria, 2019).

JABA is the flagship and hallmark journal of applied behavior analysis. Hopefully, these data reflect a movement within the field to include contributions from authors of varying seniority levels, as well as increase the representation of women in the field of behavior analysis. Analyses such as those conducted here need to be completed in a continuous manner to identify any biases that may corrupt the cultural contingencies of behavior analysis as a science. Thus, it will be interesting to see the extent to which these current trends change or remain the same in the future.

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