

Evaluation of accepted and rejected submissions in the *Journal of Applied Behavior Analysis*: Gender and experience

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Researchers have examined factors of authors such as sex of author, gender identity, and seniority within the field of behavior analysis to determine if any biases towards a certain group existed. Most recently, Kranak et al. (2020) found that women and new authors are well-represented in the *Journal of Applied Behavior Analysis (JABA)*. However, that analysis included only published manuscripts. Thus, the degree to which these subpopulations are proportionally represented is unknown, because that analysis was unable to determine how often these subpopulations are submitting manuscripts. Therefore, the purpose of the current investigation was to extend Kranak et al. and analyze all accepted and rejected manuscripts submitted to *JABA* from 2015 – 2019. Results indicated that women and men had nearly identical acceptance rates during this time period, whereas veteran authors' acceptance rate was nearly 2.5 times greater than that of new authors. Implications for publishing, reviewing, and research mentorship practices are discussed.

Key words: women and men, seniority, bias, publication, mentorship

Dissemination through publication is integral to science broadly and behavior analysis specifically. Publishing in peer-reviewed journals advances the science of human behavior, as well as the career of individual researchers. However, social barriers—including biases—can make successful publication of scientific work more difficult. Biases, such as sexism and ageism, held by reviewers and editors

can corrupt the cultural contingencies of a science, and collaterally influence what is, and can be, known (Budden et al., 2008; Knobloch-Westerwick et al., 2013; Kranak et al., 2020). That is, overt biases (such as male chauvinism) and covert biases (such as discounting the value of research important to subpopulations) may make publishing even more difficult for particular classes of individuals (e.g., Silbiger & Stubler, 2019). These biases can be harmful to the advancement of both behavior analysis at large and researchers individually (cf. Kranak et al., 2020).

On a scientific level, when only a small, select group of individuals is publishing, this can limit what is known, the types of research questions asked/areas pursued, and the diversity

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of outcomes of said research (Disis & Slattery, 2010). Such a scenario may be particularly troublesome to an applied science, where research is often translated directly into practical application with populations in need of care, as this bias may affect patients' rights. Put another way, although bias in publication practices is generally bad, it may be ethically untenable when it limits the application of cutting-edge, effective treatment strategies to patients.

Strong, well-established publication records are important to the furtherance of one's career, and perhaps most important in academia (Rawat & Meena, 2014). First, publication records play a role in hiring decisions for many academic positions (Fox, 1992). Second, after an individual is hired, promotion and tenure are largely based on continued publication success (Schimanski & Alperin, 2018). Third, publication records are one factor in securing extramural funding (e.g., "investigators" score, National Institutes of Health [NIH], n. d.). Finally, a well-established publication record often leads to prestige and respect within one's field, including behavior analysis (see Hayes, 2015). With this prestige and respect come many opportunities to shape the scientific agenda of a field such as invitations to present at conferences, editorial positions, and chances to mentor the next generation of behavior analysts, as many graduate and potential graduate students view research productivity as desirable during training (Arena et al., 2015). However, as noted earlier, biases (e.g., sexism, ageism) can negatively affect the contingencies governing review and publication practices.

One means to investigate structural biases is through systematic evaluation of publication trends and practices in behavior-analytic journals (e.g., Nosik et al., 2019), including the flagship journal, the *Journal of Applied Behavior Analysis (JABA)*. These analyses allow detection and documentation of potential biases. Documenting where biases exist sets the stage for an analysis of cultural contingencies,

and identification of means to appropriately mitigate the inimical effect of bias on science and the members of the scientific community. Researchers have been especially interested in the representation of women and new authors in behavior analysis (Dunlap et al., 1998; Dymond et al., 2000; Li et al., 2018). Broadly, women in science still face bias in academia, leading to chronic underrepresentation and lack of career advancement in their fields (viz., the "glass ceiling" effect; Guarino & Borden, 2017). Evidence of this bias is manifest in gender-based pay gaps (Xu, 2015) and diminished representation of women in certain majors and careers (e.g., STEM; Blau & Kahn, 2017). As such, bias can lead to diminished opportunities for career advancement and participation within the scientific community.¹

Similarly, although presumably stemming from distinct cultural contingencies, new authors are also highly susceptible to bias that can prevent them from successfully publishing (Dunlap et al., 1998; McGillivray & De Ranieri, 2018). The direct impact of this is that a small fraction of successful behavior analysts may dominate the direction of the field, potentially further limiting the types of research questions being asked. Muffling the voices of new researchers may directly damage a science, as new researchers may be more likely to be whistleblowers when scientific misconduct has occurred (Smith, 2006) and more likely to challenge "settled science" (Satalkar & Shaw, 2018). Further, this type of bias can inhibit the ability of junior researchers and early career academics to build and establish publication track records necessary for obtaining employment (Kranak et al., 2020), as well as extramural funding

¹It is important to note that this does not necessarily reflect the broader field of behavior analysis, where women are much more likely to engage in behavior-analytic activity (Behavior Analyst Certification Board [BACB], 2020), nor does this finding suggest that bias does not impact other aspects of being a woman behavior analyst.

(NIH, n.d.). Collaterally, when new researchers cannot obtain positions or funding, fewer voices are heard in a field.

Despite previous documentation of bias (Dunlap et al., 1998; Dymond et al. 2000), the most recent study of publication patterns in *JABA* found that women and new authors were well-represented, and that no biases were currently detectable (Kranak et al., 2020). However, a significant limitation of Kranak et al. (2020) is that the analysis could be conducted on only published articles. Thus, biases might still be present if the overall submission rate is greater for women and new authors compared to men and veteran authors. Said another way, while it is good that women and new authors are represented in what has been published, a more meaningful analysis would examine the percent of accepted and rejected manuscripts these groups encounter to determine if they are being *proportionally* represented (Iwata & Lent, 1984). Accordingly, the purpose of the current investigation was to extend procedures from Kranak et al. to determine if women and new authors are proportionately represented and compare their respective acceptance and submission rates to men and veteran authors.

Method

All manuscripts submitted for publication in *JABA* from 2015 – 2019 were examined. In total, 1416 submissions were reviewed (453 accepted submissions,² 963 rejected submissions). All accepted submissions (i.e., published articles; 32% of all reviewed submissions) were independently reviewed by two authors and compared to their respective online record to ensure accuracy of the descriptive information. Agreement was 100%. Then, a member of the *JABA* editorial team (the third author) entered

all submissions into a spreadsheet (Microsoft Excel, 2016) that included the submission name or identification number, year of submission, and name and rank (i.e., first, second, etc.) of each author. All author names were then deidentified and randomly assigned a unique identifier. No other members of the research team had access to the list of names and identifiers to ensure anonymity of the submitting authors.

Acceptance Rate of Women and Men, New and Veteran Authors

Authors were coded as women or men on the basis of their first names using procedures identical to similar investigations (e.g.; Kranak et al., 2020; Li et al., 2018). If authors' gender identities were unable to be identified through those means, a Google search was conducted using the author's full name in sources including university and professional websites (e.g., Google Scholar, ResearchGate, LinkedIn) and conference speaker biographies. This procedure allowed for all authors to be classified based on pronouns in these sources. Similarly, authors were coded as either new or veteran authors. New and veteran authors were defined in the exact same manner as previous studies (e.g., Dunlap et al., 1998; Dymond et al., 2000; Kranak et al., 2020). As a reminder, new authors were defined as individuals that had not published in *JABA* within the previous five years; veteran authors were defined as individuals that had published in *JABA* within the previous five years

To calculate acceptance rate, experimenters counted the number of total submissions and accepted submissions with women and men as first authors per year, respectively. Then, the number of accepted submissions for each group was divided by the number of total submissions of each group and that number multiplied by 100 to produce the percentage of submissions accepted for each group (Iwata & Lent, 1984). Next, this procedure was replicated

²A subset of these data was included in Kranak et al.'s (2020) analysis.

with new and veteran first authors. Experimenters also combined these categories to assess the acceptance rates of new women, new men, veteran women, and veteran men to determine if there were any intersectionality in biases.

Additionally, experimenters calculated the extent to which all author categories (e.g., women, new men; see Figures 2, 3, and 5) comprised total, accepted, and rejected submissions, respectively. For each year, experimenters (1) counted the number of total submissions by an author category and (2) divided that number by the total number of submissions. This procedure was replicated for accepted and rejected submissions. That is, accepted submissions authored by a certain category were divided by the number of *accepted* submissions; rejected submissions authored by a certain category were divided by the number of *rejected* submissions. All analyses and figures were generated using a combination of Prism 8.4.3 (GraphPad Software, 2020), R 3.6.1 (R Core Team, 2017), and Microsoft Excel (Microsoft Corporation, 2016).

Results

Women and Men, New and Veteran First Authors

Figure 1 depicts the acceptance rates of women and men (top panel) and new and veteran first authors (bottom panel). The median acceptance rate for women first authors was 29% (range, 24%–45%); median acceptance rate for men first authors was 28% (range, 27%–43%). The median acceptance rate for new and veteran first authors was 21% (range, 16%–39%) and 43% (range, 38%–55%), respectively.

Figure 2 depicts the percentage of total, accepted, and rejected submissions with women and men first authors. The median percentages of total, accepted, and rejected submissions with a woman or man as first author per year was 61% (total submissions

range, 59%–61%) and 39% (total submissions range, 39%–41%), respectively. Across years, the range of accepted submissions with a woman as first author was 55%–71%; whereas the range of accepted submissions with a man as first author was 29%–45%. Across years, the range of rejected submissions with a woman as first author was 60%–65%; whereas the range of rejected submissions with a man as first author was 35%–40%.

Figure 3 depicts the percentage of total, accepted, and rejected submissions with new and veteran first authors per year. The median percentage of total submissions by new and veteran first authors was 63% (range, 59%–65%) and 37% (range, 35%–41%), respectively. The median percentage of accepted submissions with a new or veteran first author was 45%

Figure 1

Acceptance Rates for Men and Women, New and Veteran First Authors

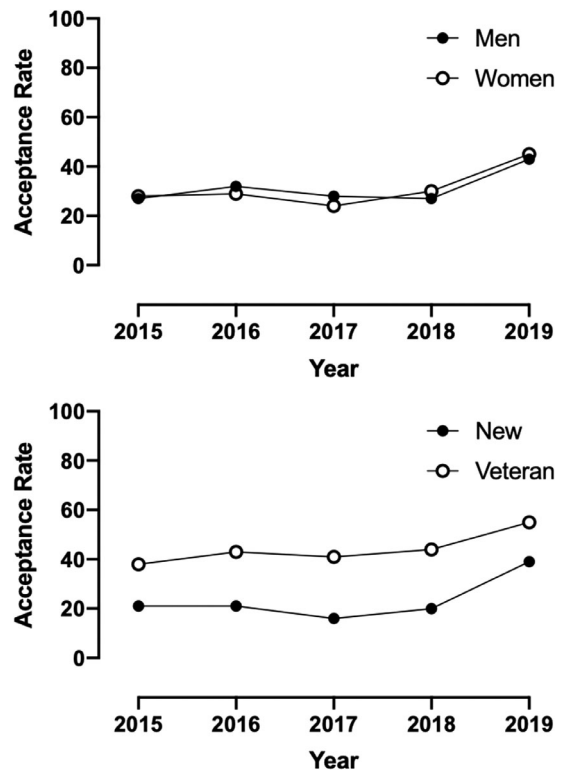


Figure 2

Percentage of Total, Accepted, and Rejected Submissions with Women and Men First Authors

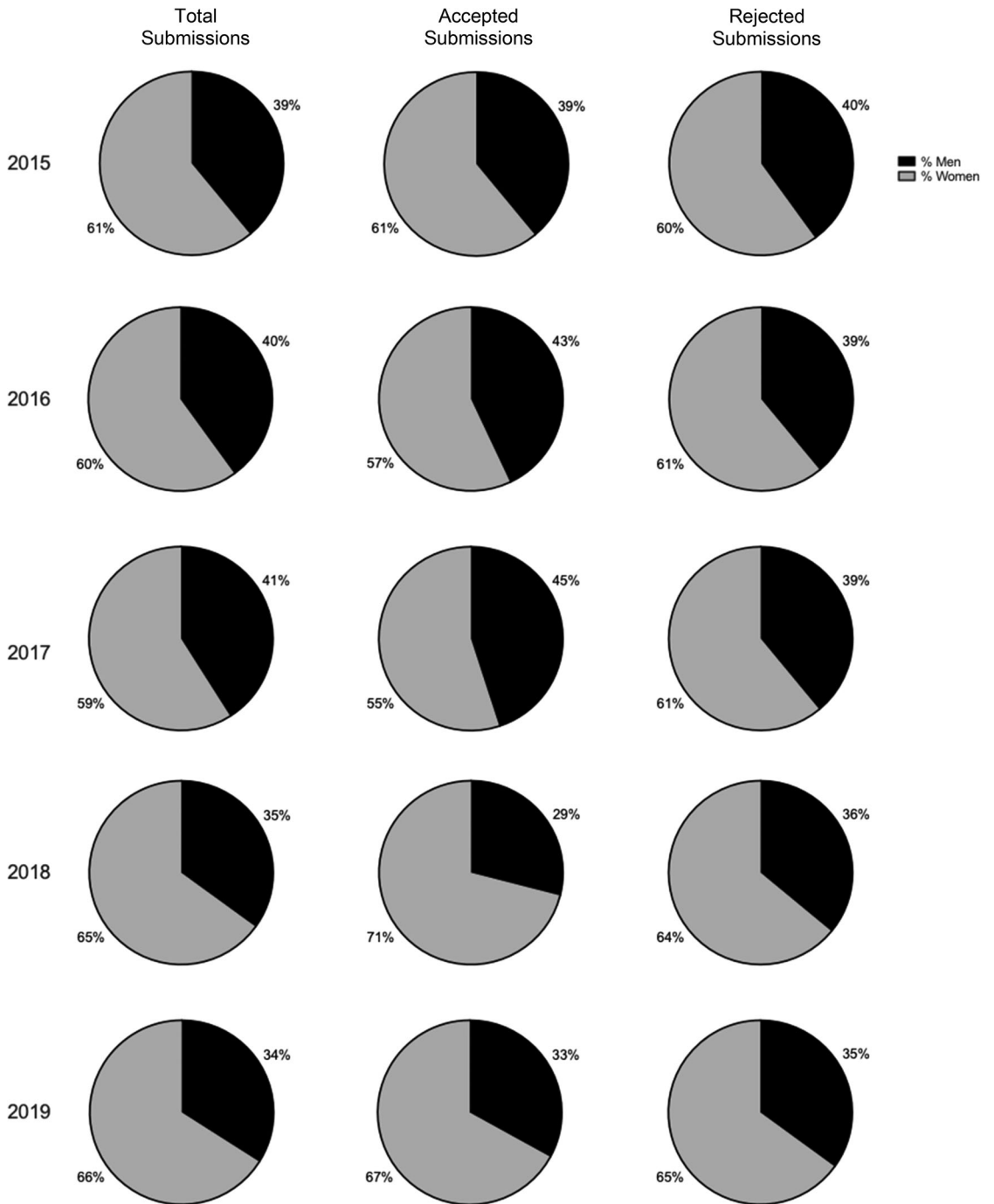


Figure 3

Percentage of Total, Accepted, and Rejected Submissions with New and Veteran First Authors

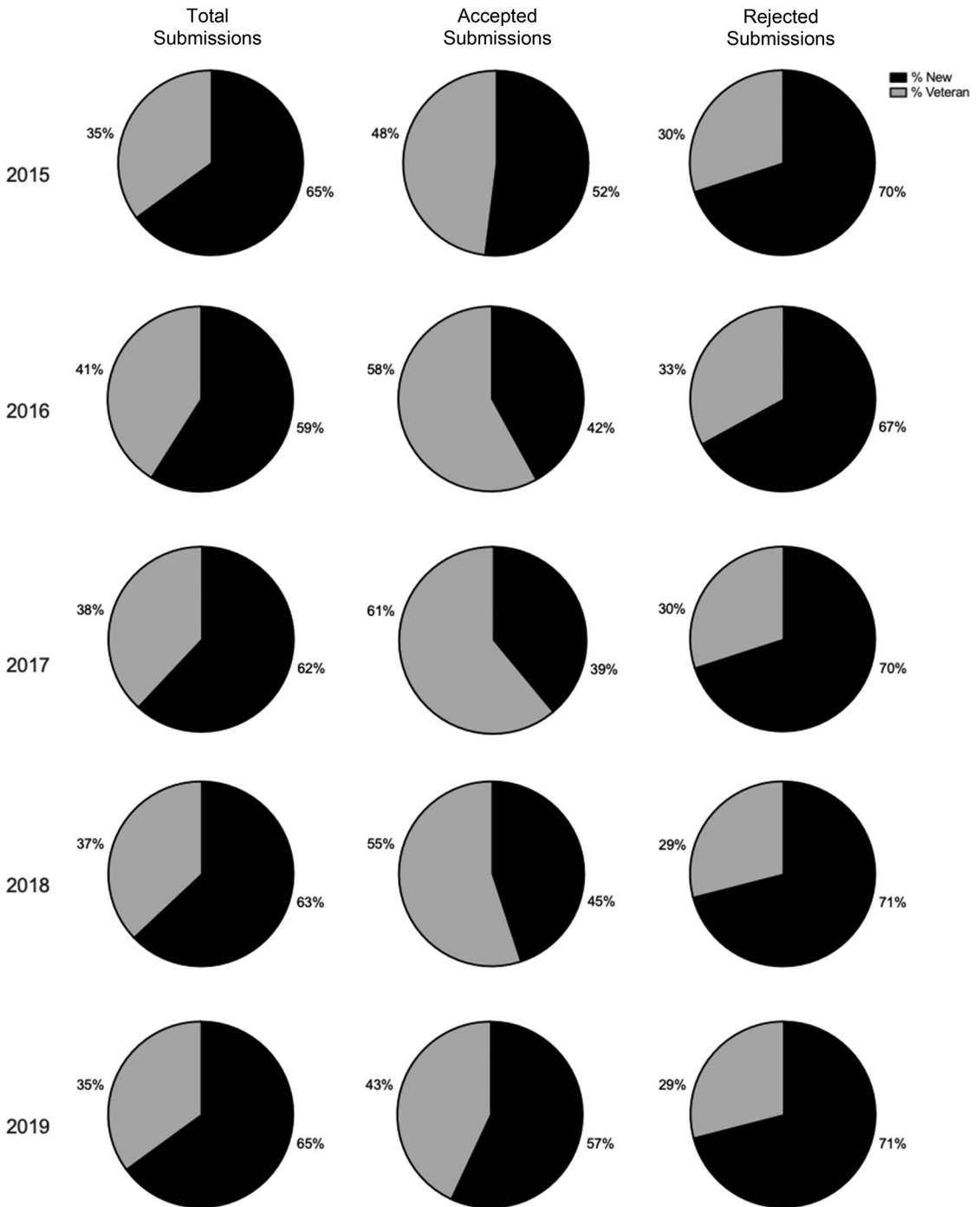
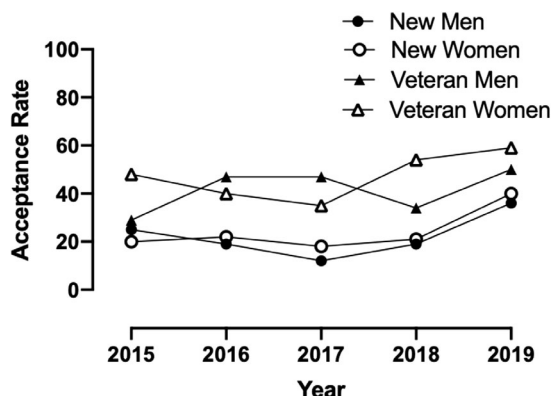


Figure 4
Acceptance Rates for New Women, New Men, Veteran Women, and Veteran Men First Authors



(range, 39%–57%) and 55% (range, 43%–61%), respectively. The median percentage of rejected submissions with a new or veteran first author was 70% (range, 67%–71%) and 30% (range, 29%–33%), respectively.

Intersectionality Analysis

Figure 4 depicts the acceptance rates of new women, new men, veteran women, and veteran men first authors. The median acceptance rate for new women first authors was 21% (range, 18%–40%); median acceptance rate for new men first authors was 19% (range, 12%–36%). The median acceptance rate for veteran women and veteran men first authors was 48% (range, 35%–59%) and 47% (range, 29%–50%), respectively. Figure 5 depicts the percentages of total, accepted, and rejected submissions with a new woman, new man, veteran woman, or veteran man as first author. The median percentage of total submissions per year with a new woman or new man as first author was 44% (range, 38%–48%) and 21% (range, 17%–22%), respectively. The median percentage of total submissions per year with a veteran woman or veteran man as first author was 19% (range, 17%–22%) and 18% (range, 14%–19%), respectively. The median percentage of accepted submissions with a new woman or a

new man as first author was 33% (range, 28%–43%) and 14% (range, 10%–19%); median percentage of accepted submissions with a veteran woman or veteran man as first author was 29% (range, 28%–33%) and 22% (range, 19%–34%), respectively. The median percentage of rejected submissions with a new woman or new man as first author was 48% (range, 42%–52%) and 22% (range, 19%–26%), respectively. The median percentage of rejected submissions with a veteran woman or veteran man as first author was 14% (range, 12%–19%) and 15% (range, 13%–18%), respectively.

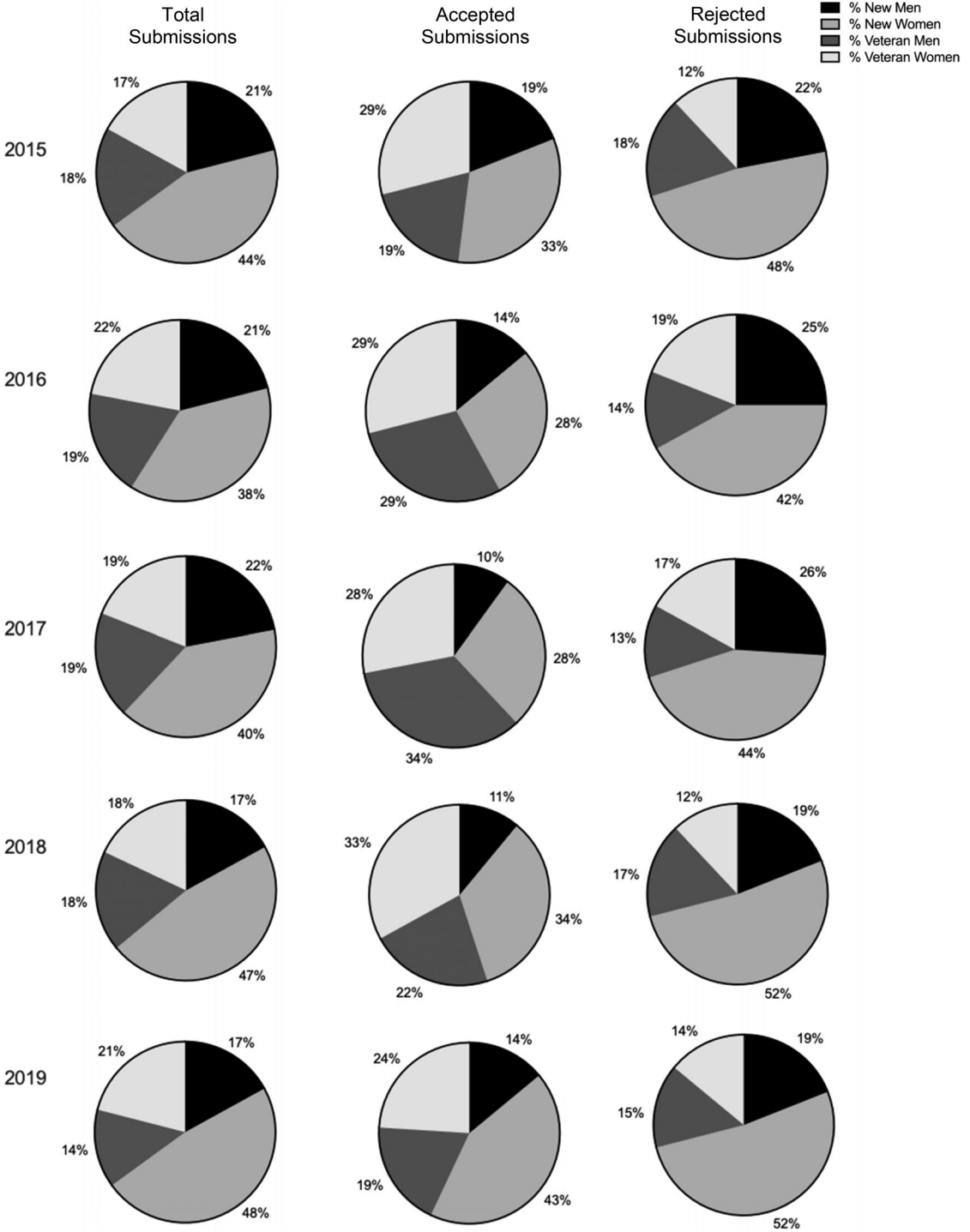
Results from supplemental Chi-Square analyses are consistent with these descriptive results. Men and women were equally likely to have their submission accepted ($p = .86$). Veteran authors were more than twice as likely to have a submission accepted relative to new authors ($X^2 = 60.1$, $p < .001$, $OR = 2.5$). Both veteran male authors ($X^2 = 21.4$, $p < .001$, $OR = 2.4$) and veteran female authors ($X^2 = 41.6$, $p < .001$, $OR = 2.7$) were more than twice as likely to have a submission accepted relative to their junior counterparts. This pattern also held true for veteran females ($X^2 = 36.9$, $p < .001$, $OR = 3.1$) and veteran males ($X^2 = 21.7$, $p < .001$, $OR = 2.1$) compared to their junior colleagues of the opposite sex. Said another way, when examining differences in accepted submissions on the basis of the author sex alone, there were no differences between men and women. However, when controlling for experience level, veteran authors outperform their junior counterparts regardless of sex. New male authors were no more likely to have their submission accepted than new female authors ($p = .4$), nor were veteran male authors more likely to have their submission accepted relative to veteran female authors ($p = .16$).

Discussion

There remain concerns that women are underrepresented in behavior-analytic research

Figure 5

Percentage of Total, Accepted, and Rejected Submissions with New Women, New Men, Veteran Women, and Veteran Men First Authors



and publications, resulting in inequalities and inequities between women and men authors (Baires & Koch, 2019; DeFelice & Diller, 2019). Researchers have recently found that women are well-represented in *JABA* (Kranak et al., 2020; Li et al., 2018). However, those analyses included only published articles. As such, it was unknown if the parity in first author publications was truly representative of underlying submission rates, or if a bias has gone undetected. The median acceptance rate for women and men in *JABA* between 2015 – 2019 was 29% and 28%, respectively. New women and veteran women also had higher median acceptance rates than their opposite-sex counterparts. In particular, veteran women had the highest acceptance rate out of any group of submitting authors, as high as 59% in 2019 alone.

Using only these circumscribed metrics (submission and acceptance rates), these data show that women are, proportionally, well-represented in *JABA*. Contrary to recent contentions (i.e., Pritchett et al., 2020), there is parity in the number of women-led submissions, accepted submissions, and rejected submissions. Given that women-led articles comprise the majority of total submissions, all other factors being equal, they ought to also comprise the majority of accepted and rejected submissions—which is currently the case. Our findings are also concordant with similar recent analyses outside of behavior analysis (i.e., Squazzoni et al., 2021) Indeed, these data ought to be encouraging to the field at large and set the stage for additional analyses of potential bias in other cultural activities, such as faculty appointments and extramural funding. It is important to note again that this does not reflect the broader field, where women are much more likely to engage in behavior-analytic activity (BACB, 2020), nor does this finding suggest that bias does not impact other aspects of being a woman behavior analyst.

The current data also show that while new author-led submissions made up approximately 65% of all submissions to *JABA* between 2015 – 2019, their submissions were more likely to be rejected (i.e., new and veteran authors rejection rates were 79% and 57%, respectively). In addition, new authors are making more submissions than veteran authors (893 versus 523 from 2015 – 2019), and veteran authors are having a larger percentage of their submissions accepted. That is, veteran authors are 2.5 times more likely to have a submission accepted than new authors.

The fact that new authors are less likely to have their work published is indeed concerning, and there are several possible explanations for this finding. The most parsimonious explanation is that veteran authors are more likely to have experienced shaping in selection of research topics and their verbal behavior through peer review and successful publication (Reed, 2014). Further, veteran authors are likely to have more experience than new authors with respect to completing a study and publishing the corresponding manuscript. Thus, by probability alone, it seems that veteran authors would have their work published. It is also possible, though unlikely, that this result is the effect of a potential bias due to the fact that *JABA* submissions are not blind. To reiterate, we do not contend that bias is the primary or sole reason for the current findings. The current work was not designed to determine the causal mechanism for this effect, as the first step was determining if the effect existed.

The current data indicate there is an opportunity to improve the representation of new authors through various mechanisms. For example, one critically important factor in terms of successfully publishing is mentorship. Many researchers attribute their success to having strong mentors, advisors, and role models (e.g., LeBlanc, 2015; Petursdottir, 2015). Indeed, mentors are often in ideal situations to

help new authors navigate the research process. To this end, mentors and new authors can benefit from setting publication and research goals from the onset of the mentorship experience (e.g., Olenick et al., 2019; Sellers et al., 2016). Mentors are also likely to provide opportunities for new authors to participate as a reviewer for journals—either independently or in conjunction with the mentor, or in a peer-review group. In fact, the opportunity to do so may be a consideration when choosing a mentor. Reviewing manuscripts submitted for publication can be an invaluable learning experience, as it provides insight into the peer-review process (i.e., what are reviewers/editors looking for, how are others framing their research; LeBlanc, 2015). Another is to gather information on how frequently and in what outlets their potential lab members, recent lab graduates, and recent program graduates are publishing (Brasier et al., 2020).

Along with individual mentors, training programs and coursework can also serve as mechanisms for shaping the necessary skillsets of new authors germane to successfully publishing. There may not be as many opportunities for individuals in practitioner-oriented training programs to build a successful publishing repertoire. Conversely, some training programs specifically emphasize research and publishing-related activities (Hayes, 2018; Wacker, 2018) and are more likely to provide mentorship in this area. Some have argued that a blend of training experiences (i.e., clinical and research emphasized) is the most desirable and will foster the continued growth of behavior analysis and researchers (Pilgrim, 2018). Thus, future researchers could also examine the nature of training programs and the contingencies they support.

Another important factor related to successfully publishing is personal history with the process. Although rejections can be aversive and may serve as a punisher for writing and research-related behavior, the feedback can help

identify areas in which authors and researchers can improve either their writing or designing of experiments. In order to directly contact these contingencies and gain this personal experience, new authors need to be involved in the submission and peer-review process.

At the time of this analysis, *JABA* used a single-blind review process. Research outside of behavior analysis unfortunately indicates that single-blind reviews tend to favor veteran authors and those from well-known, high prestige institutions (McGillivray & De Ranieri, 2018). Poling et al. (1983) suggested that, at the time of their analysis, single-blind review and biases were responsible for the underrepresentation of women in *JABA*, and that the journal ought to adopt a double-blind review process. However, Iwata and Lent (1984) revealed that (1) the acceptance rates of women and men were nearly identical (18.2% and 20%, respectively) and (2) the acceptance rate of women authors was comparable to their submission rate. Thus, the underrepresentation of women in *JABA* reported by Poling et al. was solely a function of submission rates. Notably, the submission, acceptance, and rejection rates of women authors for each year in the current analysis were nearly identical.

Iwata and Lent (1984) voiced some serious concerns (e.g., data fragmentation, manuscript duplication) and opposed Poling et al.'s (1983) suggestion that *JABA* use double-blind review. Perhaps most relevant, Iwata and Lent contended that reviewers may provide more effortful, detailed, and constructive feedback to new authors, and that veteran authors may be less appreciative of the extra effort of reviewers. Thus, the shift to double-blind may have the opposite effect—new authors may not receive the feedback necessary to shape and improve their writing repertoires. As of January 1, 2021, *JABA* is moving to a universal double-blind process. However, it is our experience that the reviewers and Associate Editors handling manuscripts will continue the strong reputation of

JABA's peer-review process, regardless of the submitting authors.

These data should be interpreted in light of two limitations. First, determining gender based on the name of authors is predated and common in similar analyses (e.g., Li et al., 2018). However, determining gender based on names of authors and making basic male–female distinctions on that basis does have apparent limitations and is a crude indicator (Curiel et al., 2020). Soliciting gender identities directly from authors would provide better information, but is unfortunately not practical (Curiel et al., 2020). Second, these data were obtained from only one journal that, at the time of the analysis, employed single-blind review. Although analyses outside of behavior analysis have revealed underrepresentation of author groups in journals that use double-blind reviews (American Society for Microbiology, 2020), future researchers may wish to also compare total, accepted, and rejected submissions from journals that use single- and double-blind reviews, respectively. Despite these limitations, our data seem suitable to support meaningful conclusions.

JABA is the flagship journal of applied behavior analysis. The observed parity between women and men should be seen as an example for other journals; whereas, the current underrepresentation of new authors could potentially be seen as an opportunity to strengthen the field. To be clear, we are not suggesting the bar be lowered for new authors in terms of standards that must be met for work to be published. Rather, by improving the repertoires of new authors germane to successful publication, we can increase the likelihood that more individuals are making meaningful contributions to and advancing the field at large. The rapid pace with which the field and profession has grown has left a shortage of experienced mentors that are needed to help build the professional infrastructure in a variety of roles outside of teaching and mentorship in writing and publication.

Thus, the importance of advisors and mentors in the research process has never been clearer (cf., LeBlanc et al., 2020), as well as the extent to which experience contributes to one's publication success. With JABA moving to double-blind review, it will be interesting to see how this new process affects authorship trends in the future.

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