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Internationalization and geographically representative scholarship in journals devoted to behavior analysis: an assessment of 10 journals across 15 years

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Abstract
There are many reasons to consider behavior analysis an international field. For example, the primary membership organization for the field has affiliated chapters in 33 countries, and individuals from 100 countries around the world are certified by the Behavior Analyst Certification Board. However, some have questioned the extent to which scholarship in behavior analytic journals is internationally representative. This study provides the most extensive analysis to date regarding internationally representative scholarship in behavioral journals. Article characteristics (e.g., authors' and participants' geographic affiliation) of 2341 articles—across 15 years and 10 journals—were analyzed. Findings indicated that these articles were predominantly written by authors working within North America and Western Europe, and similar patterns were observed when considering the country of study participants. Implications and recommendations for improving the geographic representativeness of scholarship in behavior analysis are discussed, particularly in the context of internationalization.

Keywords Behavior analysis · International · Internationalization · Publication patterns · Scholarship · Bibliometric analysis

Introduction

Within the past couple decades, the topic of internationalization has garnered growing interest in various fields and specialties, with *Scientometrics* serving as a premier cross-disciplinary outlet for this and related types of work (e.g., Bajwa and König 2019; Ibrahim 2018; Lovakov and Agadullina 2019; Payumo et al. 2019; Sivertsen 2016). Professionals within psychology and related fields have offered a variety of definitions and descriptions of internationalization (e.g., Arfken 2012; Leung et al. 2009; van de Vijver 2013), but

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most have described it as a process that allows professionals within a discipline to achieve goals aligned with representation (e.g., geographically representative scholarship), discipline-oriented growth and learning (e.g., opportunities for professionals in a discipline to enhance and benefit from intercultural consciousness), and equity and social justice (e.g., professionals having more equitable access to effective, culturally appropriate treatments and assessments). These ideas are more thoroughly discussed elsewhere (e.g., Bajwa and König 2019; Begeny 2018a, b; Bernardo et al. 2018; Ng et al. 2012).

It has been argued that internationalization is a moral, intellectual, and professional imperative (van de Vijver 2013), and it offers many potential advantages—not only for growth and development within a field, but also for professionals and the communities they serve (Arfken 2012; Begeny et al. 2018a; Leung et al. 2009). For example, nearly all definitions of internationalization in psychology highlight the importance of supporting professionals within their unique cultural and geographical contexts. This view prevents global homogenization and potentially harmful exportation of (usually) Western worldviews, constructs, values, and strategies (e.g., Arnett 2008; Bernardo et al. 2018; Leung et al. 2009). Additionally, internationalization arguably enhances professional development both within and outside of university training. It can improve researchers' and practitioners' critical intercultural consciousness and cultural humility, making them better equipped to address challenges (domestically or internationally) that come about within a globalized society (Bajwa and König 2019; Begeny 2018a). For example, a professional working with a client or collaborator would likely become more effective by engaging in practices that reflect cultural understanding and inclusivity.

As a central part of internationalization within a respective discipline or sub-discipline, many have discussed the importance of ensuring there is internationally representative, culturally informed, and accessible scholarship (e.g., Bajwa and König 2019; Begeny 2018b; O'Gorman et al. 2012). It is important for scholarship to be more geographically representative because it allows for a field to improve theory, practice, and research at a local, national, and international level (Arnett 2008; Begeny 2018a; Leung et al. 2009). With this, it offers opportunity to strengthen one's professional development and, for the field, foster the development or adaptation of culturally appropriate tools, services, and interventions (Bernardo et al. 2018; Ng et al. 2012; van de Vijver 2013). Despite the importance of scholarship that adequately reflects the global population, empirical studies across several different disciplines of psychology suggest that the vast majority of authors from mainstream scientific journals are affiliated with institutions located in North America and Western Europe (e.g. Arnett 2008; Bajwa and König 2019; Begeny et al. 2018a, b; Dymond 1997; O'Gorman et al. 2012). An overall goal of the present study is to examine geographic representation of scholars and participants within journals devoted to the discipline of behavior analysis. The following sections provide an overview of this international discipline and a summary of relevant research.

Behavior analysis

Behavior analysis began as a sub-discipline of psychology, and it emphasizes systematic analysis of observable behavior. Behavior is defined broadly to include anything an individual does when interacting with the physical environment (e.g., speaking, listening, running, shifting one's attention, and even thinking) (Fisher et al. 2011). Thus, behavior analysts view behavior as the appropriate subject matter and the basic datum for the field (Cooper et al. 2007; Fisher et al. 2011). With that in mind, behavior analysts

emphasize the study of factors that influence individuals' behaviors with the goal of either increasing adaptive behavior or decreasing problem behavior (ABAI 2019). As discussed by Fisher et al. (2011), behavior analysis has three main branches: (a) behaviorism, which is primarily involved in the study of the philosophy of behavior analysis; (b) experimental analysis of behavior, which constitutes the identification and analysis of basic behavioral principles and processes; and (c) applied behavior analysis, which involves the use of behavior analytic processes and procedures to solve socially important problems.

Since 1974, the Association for Behavior Analysis International (ABAI) has been the leading and primary membership organization for those interested in learning, teaching, researching, and practicing applied behavior analysis (ABAI 2016). There are several indications of ABAI's commitment to international work. For example, ABAI has affiliated chapters as a means to support the dissemination of behavior analysis internationally. Geographically, these affiliated chapters represent six continents and 33 countries (ABAI 2016). In addition, ABAI holds an international conference every 2 years wherein participants from around the world are invited to present and contribute, and non-U.S. affiliated chapters of ABAI are invited to make proposals for locations of future conferences.

Other characteristics evidencing the internationality of the field can be found in ABAI's *Handbook for Affiliated Chapters* (ABAI 2016), which shows a graph of the number of affiliated chapters within and outside of the United States from 1980 to 2016. The number of affiliated chapters outside of the United States rose from 20 in 2002–2004 to approximately 43 in 2014–2016. In addition, non-U.S. members grew from roughly 5000 to just over 10,000, showing a 100% increase during this time. The handbook also reveals there were 12,885 U.S. members (56%) and 10,176 other members outside of the United States (44%) in 2016. These data collectively suggest that ABAI membership is clearly becoming more international.

Another indicator of the field's internationality can be seen in data reported by the Behavior Analyst Certification Board (BACB), which is a not-for-profit organization located in the United States that aims "to meet professional credentialing needs identified by behavior analysts, governments, and consumers of behavior analysis services" (BACB 2019b). As of July 2019, just over 5000 individuals outside of the United States—representing 99 different countries—are certified by the BACB (BACB 2019a). The majority of those individuals (54%) are board certified behavior analysts (BCBAs), 30% are registered behavior technicians (RBTs), 12% are board certified assistant behavior analysts (BCaBAs), and 4% are doctoral-level BCBAs (BCBA-Ds).

Along with ABAI and the BACB, there are other institutions around the world that contribute to the international presence of behavior analysis. Initiatives taken by these organizations include translating English publications to other languages; offering training and professional development; providing assessment, consultation, and treatment in applied behavior analysis; disseminating scientific research; and providing financial support and recognition to local researchers and scholars. These organizations include but are not limited to the following: ABA España, based in Spain (ABA España 2019); the Applied and Behavioral Training Institute (ABTI), based in Dubai (Applied and Behavioral Training Institute 2019); the Children's Center, Inc., based in Japan (Children's Center 2019); the International Training Center for Applied Behavior Analysis, based in Nigeria (International Training Center for Applied Behavior Analysis 2017); and Krok po Kroku (The STEP-BY-STEP Foundation), based in Poland (Krok po Kroku 2016), to highlight just a few examples.

Evaluations of internationally representative scholarship within behavior analysis

We identified four studies that examined aspects of international scholarship within the field of behavior analysis (Dymond 1997; Dymond et al. 2000; Martin et al. 2016; Williams and Buskist 1983). In an analysis of the *Journal of Experimental Analysis of Behavior* (*JEAB*), *Journal of Applied Behavior Analysis* (*JABA*), and/or *The Behavior Analyst* (*TBA*), the two earliest studies (Dymond 1997; Williams and Buskist 1983) found a very small percentage of publications by authors working outside of the United States.

Following this earlier work, Dymond et al. (2000) reviewed and analyzed international publication trends of articles published in *JABA* from 1970 to 1990. The findings were consistent with previous research in that the majority of publications were by authors with work affiliations located in North America, including publications by new first authors (94%), new authors (91%), unfamiliar authors (98%), and frequent contributors (98%). Dymond et al.'s results were not surprising considering that behavior analysis originated and evolved in North America and because *JABA* is published in North America; however, the authors emphasized that global dissemination of behavior analysis is important, and it is problematic that the vast majority of authors are affiliated with North American institutions. More recently, Martin et al. (2016) analyzed non-U.S. publication trends in JABA from 2000 to 2014 and found that non-U.S. publications represented 9% of all publications. When data from Canada were examined, it was found that only 4.6% of the 4076 total authors had a professional affiliation with a country located outside of North America.

Overall, the four previously mentioned studies meaningfully contributed to the literature by examining international publication patterns, but there are several limitations of those studies (for brevity we focus on limitations of the two studies published in the past 20 years). First, regardless of how the authors coded it (e.g., "North America" or "international" and "U.S." or "non-U.S."), both studies categorized geographic location in terms of *inside* or *outside* of the United States, which does not allow for a deeper analysis of international publication patterns. It can be argued that grouping countries into categories created by global organizations such as the United Nations (UN) may have more validity and can be conceptualized more clearly—and such grouping may offer a broader, more holistic view of international publication patterns and characteristics. A second limitation refers to the observation that over the past 20 years, only international scholarship in *JABA* has been examined. *JABA* is regarded as an important journal for the field, but as the authors of these articles stated, there are far more journals dedicated to publishing international work in the area of behavior analysis and behavioral journals affiliated with countries outside of the United States. It is therefore important to examine international publication patterns and characteristics in a wider range of journals to gain a more comprehensive understanding of international scholarship in the field.

In the two most recent studies, Dymond et al. (2000) did not address geographic location of participants in their analyses, whereas Martin et al. (2016) coded whether a publication originated from a U.S. or non-U.S. institution but based this on author affiliation. These are notable limitations because of the tendency for some researchers to conduct studies in countries outside of the countries with which their institutions are affiliated. Thus, it is important to have separate coding procedures and variables for geographic location of authors and geographic location of participants. Ultimately, a critical question about internationalization is whether research actually represents a global population of individuals (Arnett 2008; Begeny et al. 2018b; van de Vijver 2013), regardless of where the researchers work.

Purpose of the present study and research questions

The central purpose of this study was to expand upon the previous analyses of international publication patterns in behavior analysis by reviewing 10 behavior analytic journals that publish international work. We set out to answer the following research questions. First, to examine the characteristics of published articles, we asked: (RQ1) within and across journals and geographic regions, what are the characteristics of articles in terms of authors' geographic affiliations and participants' geographic locations? Further, to assess change over time across journals and for particular journals, we asked: (RQ2) based on data measuring frequency and percentage, have article characteristics regarding first authors' geographic affiliations and participants' geographic locations changed over the 15-year time period we reviewed, either across all 10 selected journals or for any particular journal? Finally, to assess the extent to which scholarship in behavior analysis represents those working in the field around the globe, we asked: (RQ3) of the countries that have an ABAI affiliated chapter established in them, how are these countries represented in the scholarship in terms of (a) a publication with a first author working in that country, (b) a publication with a contributing author working in that country, and (c) a publication with study participants living in that country?

The present study adds to past analyses and estimates of geographically representative scholarship in behavior analysis by (a) analyzing a far greater number of journals, with each journal meeting specific inclusion criteria that aligned with our research questions, and (b) addressing important limitations of past studies that had similar research questions. This study may be of particular interest to readers of *Scientometrics* due to the journal's history as a platform for systematic research on publication trends and characteristics across various scientific disciplines (e.g., Bajwa and König 2019; Ibrahim 2018; Lovakov and Agadullina 2019; Payumo et al. 2019; Sivertsen 2016). In addition, the interdisciplinary nature of *Scientometrics* lends itself well to readers' critical thinking about their own disciplines and the ways in which international publication trends evidence differences and similarities across disciplines. Exploring cross-disciplinary research with similar goals (e.g. examining international publication trends within a respective field) also gives the benefit of understanding different methods and conceptual frameworks for addressing parallel research questions.

Method

Data acquisition and sample

Journal inclusion criteria

We conducted a bibliometric analysis across a relatively large and representative sample of articles published in the past 15 years (search period: 2002 and 2016) in journals that met three criteria: (a) being solely devoted to publishing scholarship in behavior analysis (as stated in the journal's mission statement), (b) having published articles for at least the past 15 years, and (c) having published work by authors affiliated with at least four different countries in the journal's most recent 50 articles. Consistent with past studies (e.g., Arnett 2008; Dymond et al. 2000), criterion B was developed to ensure we would examine

journals that have been in operation throughout our search period (i.e. 2002–2016), thereby avoiding potential limitations with missing data, reviewing a newer journal that may not yet have an established publication pattern, or reviewing an inactive journal. We used criterion C because past research has also used this metric to identify journals that do, in fact, show evidence of publishing international scholarship (e.g., Begeny et al. 2018b; Wang et al. in press).

Journal search procedures

We purposely developed and implemented a four-step search strategy that is broad (i.e., captures a representative and meaningful sample of behavior analytic journals published around the globe), relevant (i.e., identifies journals presented by others as being meaningful to the field), and feasible (i.e., comprehensive but not limitless). First, we searched the PsycARTICLES and PsycINFO electronic databases for any bibliometric analysis of the behavior analytic literature, knowing that such studies would report on a wide range of journals that could potentially meet our inclusion criteria. Second, we reviewed the page of the ABAI website that lists journals related to the field (see ABAI 2018) because ABAI has the largest international membership base for an organization devoted to behavior analysis and the website lists several journals that reflect geographic regions outside of North America. Third, we listed all journals found on the ABAI webpage and all journals identified within bibliometric studies. Last, we determined whether each journal met our inclusion criteria.

Based on the journal search procedures and inclusion criteria, 10 journals were evaluated: *Behavior and Philosophy* (*BP*); *Behavior and Social Issues* (*BSI*); *European Journal of Behavior Analysis* (*EJOBA*); *Journal of Applied Behavior Analysis* (*JABA*); *Journal of Behavioral Education* (*JOBE*); *Journal of the Experimental Analysis of Behavior* (*JEAB*); *Journal of Organizational Behavior Management* (*JOBM*); *Revista Mexicana da Análisis de la Conducta*, also known by its English name, *Mexican Journal of Behavior Analysis* (*MJBA*); *The Analysis of Verbal Behavior* (*TAVB*); and *The Behavior Analyst* (*TBA*). The journals identified have evidence of being important journals for the field of behavior analysis. For example, nine of the journals that ultimately met our inclusion criteria (i.e., *BSI*, *EJOBA*, *JABA*, *JOBE*, *JEAB*, *JOBM*, *MJBA*, *TAVB*, and *TBA*) were also listed on the ABAI website (ABAI 2018). In addition, our list of selected journals closely aligns with the selected journals from a bibliometric study by Shabani et al. (2004), wherein 10 journals were deemed to be "exclusively" behavior-analytic in their orientation, eight of which were included in our review. Table 1 presents relevant information about each journal included in our review.

Articles reviewed

We sampled three-year periods in each of the target journals (i.e., all articles published between 2002–2004, 2008–2010, and 2014–2016) within all 10 selected journals. This method of analyzing ranges of years to examine publication patterns over time is relatively common, especially when reviewing journals across 10 or more years (e.g., Arnett 2008). Also, using data for each of 15 years (2002–2016) that were published in two recent studies examining 11 educational psychology journals, we found that the aforementioned nine-year sampling method almost always resulted in data within 1% of the 15-year sampling

Table 1 Information about selected journals

Journal name	Publisher	Years of operation	Open access or subscription?	Number of countries represented of past 50[a]
Behavior and Philosophy (BP)	Cambridge Center for Behavioral Studies (England)	1973-present	OA	9
Behavior and Social Issues (BSI)	University of Illinois at Chicago Library (U.S.)	1991-present	OA	8
European Journal of Behavior Analysis (EJOBA)	Taylor & Francis (England)	2000-present	SUB	12
Journal of Applied Behavior Analysis (JABA)	John Wiley & Sons (U.S.)	1968-present	SUB	4
Journal of Behavioral Education (JOBE)	Springer (Germany)	1991-present	SUB	6
Journal of the Experimental Analysis of Behavior (JEAB)	John Wiley & Sons (U.S.)	1958-present	SUB	6
Journal of Organizational Behavior Management (JOBM)	Taylor & Francis (England)	1977-present	SUB	5
Mexican Journal of Behavior Analysis (MJBA)	Mexican Society for Behavior Analysis (Mexico)	1977-present	OA	10
The Analysis of Verbal Behavior (TAVB)	Springer (Germany)	1982-present	SUB	7
The Behavior Analyst (TBA)	Springer (Germany)	1978-present	SUB	6

All journals published abstracts and articles in English except the *Mexican Journal of Behavior Analysis,* which published abstracts in English and Spanish and full articles in either English or Spanish

OA, open access; SUB, subscription required

[a]This variable refers to one of our criteria for journal selection, which states that the journal must have publications with authors from at least four different countries in the most recent 50 publications starting from the end of 2016. As the table shows, each journal met or exceeded this criterion

method across each journal and geographic region. Thus, there is evidence that a nine-year sampling method closely approximates data collected per year across 15 years.

Decisions about variables and coding

We coded *author's geographic affiliation* (i.e., the geographic location of the author's professional affiliation) and *participants' geographic location* (i.e., the country or countries in which study participants lived) using numeric codes that were developed and assigned for each country. Countries were then grouped into geographic regions using the UN Regional Groups of Member States (2018) classification list, which offers an internationally recognized way to classify and group 193 countries into five geopolitical regional groups: (1) the African Group (AG); (2) the Asia–Pacific Group (APG); (3) the Eastern European Group (EEG); (4) the Latin American and Caribbean Group (GRULAC); and (5) the Western European and Others Group (WEOG), with "Others" including countries such as Australia, Canada, Israel, New Zealand, and the United States. We used this UN classification system because it is relevant both geographically and politically and because it is consistent with research that states that research in behavior analysis predominantly originates from Western Europe and North America (e.g., Dymond 1997; Dymond et al. 2000; Martin et al. 2016).

Training coders, coding the data, and obtaining inter-coder reliability

A researcher with extensive knowledge in coding for bibliometric analyses trained members of the research team to code articles. Following training, research assistants were assigned 19 articles to independently code during the week and send to the lead trainer. The inter-coder agreement criterion was set at 90% or higher for each of the variables coded (Nastasi 2009). Each team member exceeded this criterion; the range of coders' accuracy was 92–98% for *authors' geographic affiliation* and 93–100% for *participants' geographic affiliation*. In a follow-up meeting, the lead trainer discussed each discrepancy with all coders to further strengthen their understanding of all coding procedures. Although disagreements in coding were minimal during practice coding, they occasionally occurred as a result of a coder (a) incorrectly labeling the location of a university or institution based on its name (e.g., a university in Egypt with "American" in its name was incorrectly coded as being in the United States); (b) mistakenly coding participants' geographic location to be the same as an author's geographic affiliation (e.g., an article written by an author affiliated with a Norwegian university was incorrectly coded to have participants who lived in Norway even though participants lived in Finland); and (c) mistakenly coding territories as countries (e.g., an article affiliated with Puerto Rico may be coded as affiliated with the United States). Because discussion about these potential coding errors occurred during training, the coders were better prepared to code articles accurately during the data collection process.

Following training, each coder was assigned articles from one or more of the 10 selected journals. Coded data were periodically reviewed by the first author throughout the process for accuracy and consistency, and in any case when a coder had a question about accurate coding, the coder discussed it with the first author. For purposes of inter-coder reliability, 586 (25%) of the articles were double-coded. Inter-coder reliability was high across categories: 97% for *authors' geographic affiliation* and 95% for *participants' geographic location*, representing a mean inter-coder reliability of 96%.

Data analysis

Consistent with previous reviews of journal article characteristics in behavior analysis, we used descriptive statistics as the primary source of data for analyses and interpretations. Also consistent with previous research on geographic representativeness and characteristics of journal publications (e.g., Arnett 2008; Begeny et al. 2018b), we supplemented descriptive statistics with χ^2 analyses in order to identify how likely it is that differences in publication characteristics between our specified periods of time (grouped as 2002–2004, 2008–2010, and 2014–2016) were due to chance.

Results

RQ1: article characteristics within and across journals

Our first research question aimed to examine article characteristics within and across journals and geographic regions.

First authors' geographic affiliation

Table 2 presents information about the geographic affiliation of first authors. Across all journals, the majority of articles included first authors from the WEOG (90.2%). In contrast, the lowest percentage of first authors came from the AG (0.1%). Low percentages were also seen for first authors from the EEG (0.2%), the APG (1.0%), and the GRULAC (8.5%). *JABA* had the highest percentage of articles with first authors from the WEOG (99.1%), and *MJBA* had the lowest percentage of articles with first authors from the WEOG (19.0%)—in fact, it was the only journal that did not have a vast majority of articles with first authors from the WEOG; the majority of articles in *MJBA* included first authors from the GRULAC (78.5%). *JEAB* was the only journal to include articles by first authors from all five geographic regions. When looking across journals and specifically examining the percentage of first authors from North America, 78.0% of all articles included a first author from the United States, and 1.4% of all articles included a first author from Canada. *JABA* had the highest percentage of articles with first authors from the United States (93.6%), and *MJBA* had the lowest percentage of articles with first authors from the United States (17.1%). The majority of articles in *MJBA* were published by first authors affiliated with Mexico (70.9%).

Contributing authors' geographic affiliation

Table 2 also presents information about the geographic affiliation of contributing authors. Patterns similar to what we observed with first authors were also observed for contributing authors. The vast majority of all articles included contributing authors from the WEOG (91.5%), whereas the fewest articles included contributing authors from the EEG (0.1%). Low percentages were also seen for articles with contributing authors from the AG (0.2%), the APG (0.5%), and the GRULAC (7.6%). *JOBE* had the highest percentage of articles with contributing authors from the WEOG (99.6%), and *MJBA* had the lowest percentage of articles with contributing authors from the WEOG (16.1%). The majority of articles in

Table 2 Geographic affiliation of authors of all articles within and across selected journals

	BP ($n=122$)	*BSI* ($n=99$)	*EJOBA* ($n=170$)	*JABA* ($n=643$)	*JOBE* ($n=191$)	*JEAB* ($n=488$)	*JOBM* ($n=154$)	*MJBA* ($n=158$)	*TAVB* ($n=119$)	*TBA* ($n=197$)	Total ($n=2341$)
First author											
From AG	–	–	–	0.2	–	0.4	–	–	–	–	0.1
From APG	–	–	–	0.2	0.5	2.7	1.3	2.5	1.7	0.5	1.0
From EEG	–	–	–	–	–	0.6	1.3	–	–	–	0.2
From GRULAC	11.5	9.1	8.5	0.6	0.5	4.1	0.6	78.5	5.0	2.0	8.5
From WEOG	88.5	90.9	91.5	99.1	99.0	92.2	96.8	19.0	93.3	97.4	90.2
CAN[a]	0.8	2.0	2.0	1.4	1.0	1.6	–	–	1.7	2.0	1.4
USA[a]	68.0	80.8	43.1	93.6	94.8	71.1	89.6	17.1	88.2	89.8	78.0
Contributing authors											
From AG	–	–	–	0.2	–	0.4	1.3	–	–	–	0.2
From APG	–	–	0.4	0.1	0.4	1.1	0.4	2.1	–	0.7	0.5
From EEG	–	–	–	–	–	0.5	0.9		–	–	0.1
From GRULAC	12.0	13.3	16.6	0.7	–	4.4	1.3	81.8	3.5	0.7	7.6
From WEOG	88.0	86.7	83.0	99.1	99.6	93.6	96.0	16.1	96.5	98.6	91.5
CAN[a]	–	–	2.2	1.3	2.4	1.6	–	–	3.5	4.9	1.6
USA[a]	68.0	76.1	29.6	94.3	91.9	68.1	89.8	12.0	85.6	84.7	79.5

Data in this table are reported as percentages

AG, African group; APG, Asia–Pacific group; EEG, Eastern European group; GRULAC, Latin American and Caribbean group; WEOG, Western European and others group; CAN, Canada; USA, United States of America

[a]Although this country's data are reported within the WEOG category, the country's individual data are also reported separately due to previous literature indicating that the vast majority of research originates from North America

MJBA had first authors from the GRULAC (81.8%) and, compared to all other journals, it clearly had the lowest percentage of contributing authors from the WEOG. *JEAB* was the only journal to include articles by contributing authors from all five geographic regions. When examining North America specifically, 79.5% of contributing authors of all articles were affiliated with the United States, and 1.6% were affiliated with Canada. *JABA* had the highest percentage of articles with contributing authors from the United States (94.3%), and *MJBA* had the lowest percentage of articles with contributing authors from the United States (12.0%). The majority of articles in *MJBA* had contributing authors from Mexico (76.0%).

Participants' geographic location

Table 3 presents information about the geographic location of participants in empirical articles within and across journals. The vast majority of all articles had study participants from the WEOG (92.1%), whereas no articles had study participants from the EEG. When considering other geographic regions, 0.2% of study participants were in the AG, 0.9% of participants were in the APG, and 6.8% of participants were in the GRULAC. *BP* and *JOBE* had the highest percentage of articles with study participants from the WEOG (100.0% for both journals), though it should be noted that only three articles from *BP* included participants. *MJBA* had the lowest percentage of articles with study participants from the WEOG (9.3%). Aside from *MJBA*, which published 88.9% of articles with study participants from the GRULAC, all journals had a large majority of study participants from the WEOG. None of the journals had articles with study participants from all five geographic regions. When examining North America specifically, 81.1% of all articles had study participants from the United States, and 1.2% of all articles had study participants from Canada. Aside from *MJBA*, which published 85.2% of articles with study participants from Mexico, all journals had a majority of articles with study participants from the United States.

RQ2: differences between periods of time in article characteristics within and across journals

Our second research question explored the differences between periods of time in any of the article characteristics by using χ^2 analyses.

Differences between time periods in first authors' geographic affiliation

Table 4 presents data related to first authors' geographic affiliation and years. We categorized articles as either (a) having a first author from a country within the WEOG or (b) having a first author from a country outside of the WEOG. Across all journals, there is a significant association between first authors' geographic affiliation and years ($\chi^2(2) = 11.17$, $p = 0.004$). When examining the percentages of articles with first authors outside of the WEOG, there has been a small but statistically significant increase over the time periods we examined. In 2002–2004, 6.9% of all articles had a first author outside of the WEOG, followed by 12.0% in 2008–2010, and 10.2% in 2014–2016. Figure 1 presents data related to the percentage of first authors outside of the WEOG in all journals across all the years we examined. For individual journals, there is a significant association between first authors' geographic affiliation and years in *JEAB* ($\chi^2(2) = 7.13$, $p = 0.03$), showing a small but notable increase in articles with first authors outside of the WEOG. Figure 2 presents

Table 3 Geographic location of participants in all empirical articles within and across selected journals

	BP ($n=3$)	*BSI* ($n=24$)	*EJOBA* ($n=66$)	*JABA* ($n=609$)	*JOBE* ($n=164$)	*JEAB* ($n=117$)	*JOBM* ($n=77$)	*MJBA* ($n=54$)	*TAVB* ($n=70$)	*TBA* ($n=20$)	Total ($n=1204$)
Participants											
From AG	–	–	–	–	–	0.9	1.3	–	–	–	0.2
From APG	–	4.2	–	0.2	–	3.4	3.9	1.9	1.4	–	0.9
From EEG	–	–	–	–	–	–	–	–	–	–	–
From GRU-LAC	–	20.8	12.1	0.8	–	8.5	1.3	88.9	5.7	5.0	6.8
From WEOG	100	75.0	87.9	99.0	100	87.2	93.5	9.3	92.9	95.0	92.1
CAN	–	–	1.5	1.5	1.2	0.9	–	–	2.9	–	1.2
USA	100	66.7	27.3	93.4	95.1	61.5	84.4	7.4	84.3	70.0	81.1

Data represent all countries listed in an article. Therefore, in cases where articles had more than one country as sources of data, all countries listed were used in the data reported in this table

Table 4 Change over time in first authors' geographic affiliation within and across selected journals

Journal	2002–2004		2008–2010		2014–2016		χ^2
	Within WEOG	Outside of WEOG	Within WEOG	Outside of WEOG	Within WEOG	Outside of WEOG	
BP	87.5	12.5	91.8	8.2	82.3	17.6	1.22
BSI	97.7	2.3	89.3	10.7	81.5	18.5	5.47
EJOBA	90.7	9.3	90.0	10.0	92.5	7.5	0.27
JABA	99.4	0.6	99.1	0.9	98.8	1.2	0.46
JOBE	98.1	1.9	100	–	98.6	1.4	1.07
JEAB	95.7	4.3	93.1	6.9	88.0	12.0	7.13*
JOBM	100	–	94.9	5.1	96.7	3.3	1.78
MJBA	12.9	87.1	4.5	95.5	37.7	62.3	23.59***
TAVB	100	–	88.6	11.4	91.7	8.3	4.03
TBA	100	–	97.0	3.0	95.0	5.0	3.38
All journals	93.1	6.9	88.0	12.0	89.8	10.2	11.17**

Data in this table are reported as percentages except for χ^2 results

*$p < 0.05$

**$p < 0.01$

***$p < 0.001$

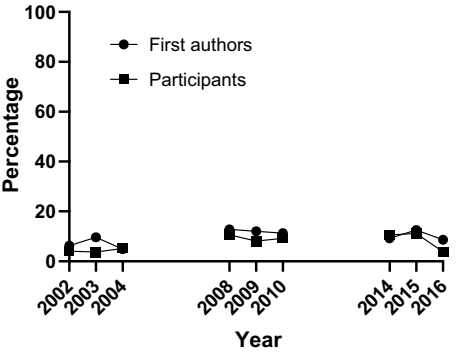

Fig. 1 Percentage of first authors and participants outside of the Western European and Others Group (WEOG) across all journals

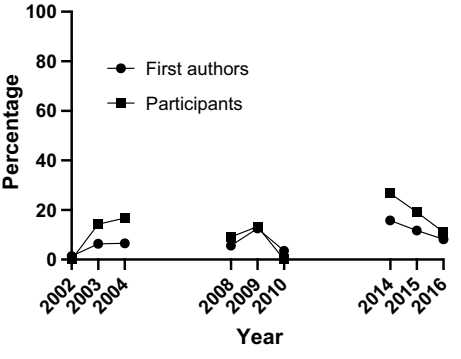

Fig. 2 Percentage of first authors and participants outside of the Western European and Others Group (WEOG) within the *Journal of the Experimental Analysis of Behavior* (*JEAB*)

data related to the percentage of articles with first authors outside of the WEOG within *JEAB* across the years included in our analyses. There is also a significant association between first authors' geographic affiliation and years in *MJBA* ($\chi^2(2) = 23.59$, $p < 0.001$), such that the percentage of articles with first authors outside of the WEOG went from 87.1% in 2002–2004, to 95.5% in 2008–2010, and then dropped considerably to 62.3% in 2014–2016. Figure 3 shows data related to the percentage of articles with first authors outside of the WEOG within *MJBA* across all the years examined in the current study.

Differences between time periods in participants' geographic affiliation

Table 5 presents data related to participants' geographic location and years. Although there is no significant association between participants' geographic location and years within individual journals, there is a significant association between participants' geographic location and years across all journals ($\chi^2(2) = 6.56$, $p < 0.04$). Data suggest that although there is some fluctuation, the percentage of participants outside of the WEOG has slightly increased over the years, from 4.3% in 2002–2004 to 9.2% in 2008–2010 and then finally to 8.9% in 2014–2016. Figures 1, 2, and 3 show data related to the percentage of articles with participants located outside of the WEOG across all journals, within *JEAB*, and within *MJBA*, respectively.

RQ3: scholarship representation of countries with ABAI affiliated chapters

As mentioned previously, ABAI has affiliated chapters in 33 different countries around the world. Table 6 presents data regarding the representation of each of these countries in terms of the percentage of (a) publications with a first author from that country, (b) publications with contributing authors from that country, and (c) publications with participants living in that country. Overall the countries with an affiliated chapter represent the vast majority of countries reflected in each of these three categories: 99.6% of all first authors, 98.9% of contributing authors, and 99.0% of participants. Although these 33 countries represent nearly all of the coded articles, we identified 16 countries that did not have an affiliated chapter but were reflected in the data (see the note for Table 6 for a complete list of these countries or territories).

Only 18 of the 33 countries (54.5%) are represented in all three variables (i.e., first author, contributing author, and participants). Of those 18 represented countries, 14 (77.8%) are countries within the WEOG. In contrast, seven out of 33 countries (21.2%) are

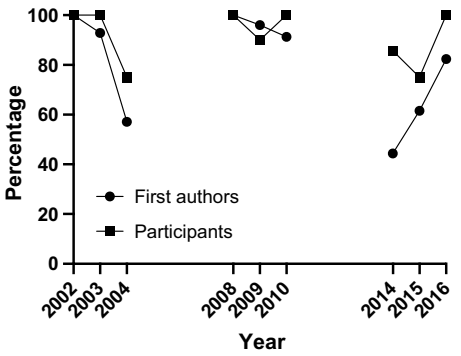

Fig. 3 Percentage of first authors and participants outside of the Western European and Others Group (WEOG) within the *Mexican Journal of Behavior Analysis* (*MJBA*)

Table 5 Change over time in participants' geographic location within and across selected journals

Journal	2002–2004		2008–2010		2014–2016		χ^2
	Within WEOG	Outside of WEOG	Within WEOG	Outside of WEOG	Within WEOG	Outside of WEOG	
BP	–[a]	–[a]	100	–	100	–	–[b]
BSI	100	–	90.9	9.1	50.0	50.0	5.82
EJOBA	83.3	16.7	88.9	11.1	88.9	11.1	0.28
JABA	99.4	0.6	99.1	0.9	98.7	1.3	0.49
JOBE	100	–	100	–	100	–	–[b]
JEAB	91.7	8.3	93.0	7.0	80.0	20.0	4.05
JOBM	100	–	93.9	6.1	91.2	8.8	1.01
MJBA	12.5	87.5	3.6	96.4	16.7	83.3	2.35
TAVB	100	–	86.4	13.6	94.9	5.1	2.33
TBA	100	–	100	–	–[a]	–[a]	–[b]
All journals	95.7	4.3	90.8	9.2	91.1	8.9	6.56*

Data in this table present participants' geographic location as the first region reported in an article. Therefore, in cases where articles had more than one country as sources of data, only the first country listed was used for the data presented in this table

[a]These represent instances when a journal did not publish any empirical articles. Instead, the journal published narrative articles or literature reviews that did not collect data from a specific country

[b]These represent instances when participants' geographic location was WEOG across all years or when data were not collected from specific countries; therefore, χ^2 tests could not yield results

*$p < 0.05$

not represented in any of the three variables. These countries are Bermuda, Lebanon, the Philippines, Poland, Saudi Arabia, Taiwan, and the United Arab Emirates. Finally, eight countries (24.2%)—China, Colombia, India, Jordan, Kenya, Korea, Sweden, and Switzerland—are represented in one or two areas but not in all three areas.

Discussion

A central goal of this study was to conduct a deeper evaluation of international scholarship and publication patterns in the field of behavior analysis. In order to achieve this goal, we analyzed 10 behavior analytic journals with evidence of having at least some diversity of authors' geographic affiliation. Using data from 9 years of articles across a 15-year period (2002–2016), the study generated findings that may be of interest for a variety of reasons (e.g., an interest in a particular journal, country, or research question). However, for concision we only describe what we view as key findings and then discuss possible interpretations and implications.

Overall, our findings showed that authors and participants reflected in scholarly publications predominantly represent countries from the WEOG, and particularly the United States. This is despite the fact that there are ABAI chapters in 32 countries outside of the United States. However, some journals reflect relatively less U.S.-based scholarship (*EJOBA* and *MJBA*), and *MJBA* was the only journal where the vast majority of

Table 6 Percentage of articles with first authors, contributing authors, and study participants from countries with Association for Behavior Analysis International (ABAI) affiliated chapters

ABAI affiliated chapter location	First author	Contributing authors	Participants
Australia	0.3	0.2	0.2
Bermuda	–	–	–
Brazil	2.2	2.0	1.9
Canada	1.4	1.6	1.2
Colombia	0.04	0.02	–
China	–	–	0.1
France	0.2	0.1	0.3
Germany	0.2	0.3	0.2
Hong Kong	0.1	0.02	0.1
Iceland	0.2	0.1	0.4
India	–	–	0.1
Ireland	1.6	1.4	1.8
Israel	0.3	0.1	0.2
Italy	0.2	0.3	0.3
Japan	0.8	0.7	0.4
Jordan	–	–	0.1
Kenya	–	0.02	–
Korea	–	0.02	0.2
Lebanon	–	–	–
Mexico	6.0	5.5	4.7
New Zealand	2.4	2.4	0.9
Norway	1.3	0.8	1.2
Philippines	–	–	–
Poland	–	–	–
Saudi Arabia	–	–	–
Spain	0.6	0.9	1.2
Sweden	0.1	0.1	–
Switzerland	–	0.02	–
Taiwan	–	–	–
Turkey	0.1	0.1	0.2
United Arab Emirates	–	–	–
United Kingdom	2.6	2.7	2.2
United States	78.0	79.5	81.1
Total	98.6	98.9	99.0

Data in this table are reported as percentages. Affiliated chapter locations were obtained from the ABAI *Handbook for Affiliated Chapters* (2016). Sixteen countries or territories were identified in the scholarship but did not have an affiliated chapter: Algeria, Argentina, Belgium, Denmark, Dominican Republic, Ghana, Greece, Hungary, the Netherlands, Peru, Portugal, Puerto Rico, Qatar, Russia, Tanzania, and Ukraine

authors and participants were not affiliated with countries from the WEOG. In addition, we found that *JEAB* demonstrated a relatively meaningful and statistically significant increase in first authors representing non-WEOG countries. This represents not only a

positive but also an opportunity to better understand the variables that influence authorship from underrepresented countries.

Our findings also revealed that outside of the United States, there was increased scholarly representation of select countries within the journals we selected for review. In terms of first author representation, after excluding the United States, the countries with the highest percentage of articles with a first author from that country were Mexico (6%), the United Kingdom (2.6%), New Zealand (2.4%), Brazil (2.2%), Ireland (1.6%), and Canada (1.4%). Patterns were similar when examining participant representation, with Mexico at the forefront (4.7%), followed by the United Kingdom (2.2%), Brazil (1.9%), Ireland (1.8%), and then Spain, Canada, and Norway (each at 1.2%). When exploring potential causes contributing to the scholarly representativeness of the field, it is important to consider the various factors that could have shaped the development of behavior analysis in various parts of the world, including some of the aforementioned countries.

Factors contributing to the growth of behavior analytic scholarship within some regions

In various fields outside of behavior analysis, contextual and historical factors have influenced either the increase or decrease of research outputs in certain regions. For example, scholars have examined the effect of the Arab Spring on scientific research output in the Arab World (e.g., Ibrahim 2018) and the influence of isolation from Western society on psychological research output in post-Soviet countries (e.g., Lovakov and Agadullina 2019).

In the following paragraphs, we provide relevant case illustrations of the development, promotion, and dissemination of behavior analysis in select regions of the world. In the case of Brazil, Todorov (2016) reports trends of behavior analysis within Brazil and states that as of 2016, the number of psychology undergraduate courses offered in Brazil were more than 220, and of those courses, most were focused on behavior analysis. Approximately 30 universities in Brazil offer courses in behavior analysis, with 15 of those universities offering PhD degrees. According to Todorov, this high volume of activity, research, and knowledge was initiated when Professor Fred S. Keller, an American psychologist and a pioneer in behavior analysis, served as a Fulbright scholar at the University of São Paulo in 1961. Todorov reports that although Brazil has a high number of behavior analytic researchers and publications, Brazilian researchers continue to be underrepresented in citations.

Regarding the influence that researchers in a specific region can have on the field, another good example can be found with the history of behavior analysis in the Canadian province of Manitoba. Walters and Thompson (2013) explain that in the latter half of the 1960s, professors Garry Martin and Joseph Pear taught behavior analytic courses at the University of Manitoba and started behavioral treatment and research programs at two main residential facilities for people with intellectual disabilities and autism, the Manitoba Developmental Center (MDC) and St. Amant. Since then, the experiences, knowledge, and skills gained in Manitoba have been shared around the world, and behavior analysis in the province has thrived. Authors affiliated with Manitoba have published books that have been translated into various languages, and University of Manitoba graduates have gained recognition around the world due to their knowledge, expertise, and contributions to the field of behavior analysis.

When considering the growth of behavior analysis within a country or a region, scholarship offered by Todorov (2016), Walters and Thompson (2013), and others helps to reveal several influential factors (for another example of such scholarship, see Bayés (2003) for an account of how behavioral analysis emerged within Spain and some Spanish speaking countries within Latin America). For instance, it seems that in many cases, a person or small group of people is credited to have started something new or different within the region. For example, Keller had a major impact in Brazil when completing a fellowship at the University of São Paulo, Martin and Pear started and helped to sustain professional activities by providing treatment programs at local facilities, and Bayés played an influential role in the translation of behavior analytic scholarship, including the works of B. F. Skinner.

These are just a few examples that occurred outside of the country that behavior analysis originated from (the United States), all of which have helped the field and related scholarship to grow in particular global regions. More than that, however, facilities and resources (e.g., scholarships, universities, residential facilities, or established journals) appeared to be in place or were developed so that individuals could more easily apply their knowledge and expertise in a region where behavior analysis was otherwise absent or less known. Therefore, it appears that local structures within communities play an important role in furthering the advancement of a field within a country or region. Examining the various historical factors that contributed to the development of behavior analysis over the years also reveals that regions with university programs that offer courses and training opportunities—as well as regions with resources and the capacity to offer funding and support for students and researchers—are more likely to experience success with increasing and sustaining their scholarly contributions to the field. In addition, collective work in the area of internationalization suggests there are other actions that could support our international colleagues and help improve internationally representative scholarship.

Some recommendations that could improve internationally representative scholarship

Disproportionate representation of scholarship within a discipline or specific journal is a complex topic, and there are no simple explanations or easy solutions (Begeny 2018a; Martin et al. 2016). Like others, we recognize the numerous variables that influence the degree to which a discipline has geographically representative scholarship, and limited geographical representation is certainly not unique to behavior analysis (Bajwa and König 2019; Ibrahim 2018; O'Gorman et al. 2012). Potential explanations for this lack of representation have been thoroughly discussed in prior scholarship (e.g., Arnett 2008; Begeny et al. 2018b; van de Vijver 2013), and we encourage interested readers to consider those and related sources. We note here that although there are speculative explanations with varying degrees of evidence to support them (e.g., linguistic factors, the proportion of graduate programs within particular countries, authors' preference to publish in "other" journals, lack of "quality" manuscript submissions from authors in underrepresented countries, implicit biases held by journal editorial board members about what constitutes "quality" research), we agree with past researchers on this topic that it is a moral, intellectual, and professional problem if the scholarship within a field—or within most of its journals— predominantly represents only a fraction of the world's population and, particularly, the global minority that is the Western world (Arnett 2008; Begeny 2018b; van de Vijver 2013). We also encourage readers to explore past recommendations that could assist professionals within a

field to address problems with scholarly underrepresentation and disproportionality (Arnett 2008; Begeny et al. 2018a, b; Dymond et al. 2000). Here, however, we provide five additional recommendations that could help the field of behavior analysis assess and improve geographic scholarly representation.

First, our data revealed that country- and region-focused journals such as *EJOBA* and *MJBA* significantly contribute to the amount of research coming from countries outside of the WEOG and outside of the United States. Therefore, following the establishment of professional organizations, research and practice institutions, and/or graduate and academic programs within a region or country, we recommend the establishment and support of more country- or region-focused journals within the field. Data from the ABAI (2016) show there are several affiliated chapters and members within Asia and Africa. Members in these regions may express interest in region-focused journals, and the establishment of such journals in underrepresented regions would likely promote scholarly work within those regions. In addition, the development of regional or national journals can further help researchers in a particular region connect with their local culture and communities (Sivertsen 2016).

Second, we found that *across* journals, there was a significant increase in authors and participants not affiliated with WEOG countries, but there was not much change *within* individual journals (with the exception of *JEAB*). When examining participants' geographic affiliation, no significant increases were found over time within any journals. Based on these findings, we recommend stronger efforts to promote and enhance collaboration between authors from different countries and global regions. Transnational collaboration—using values specifically connected to the social justice dimensions of internationalization (see Begeny 2018a; Ibrahim 2018; Leung et al. 2009; Lovakov and Agadullina 2019; Payumo et al. 2019)—is an important component of internationalization that could meaningfully advance internationalization within behavior analysis. Some ways to promote such collaborations is through facilitating strategic networking sessions during events such as the ABAI international conference, initiating journal-led activities that take place during professional training, and establishing connections between researchers and universities in different countries and regions (Payumo et al. 2019; Lovakov and Agadullina 2019). Along these lines, Begeny et al. 2018a, b offer several in-depth suggestions that seem relevant for the field of behavior analysis.

Third, as a leading membership-based organization, ABAI has forged a path for internationalizing the field and has done so in numerous areas (e.g., international conferences and increases in international members and affiliate chapters). However, we urge leaders and members of ABAI to consider the data presented in this paper and earlier papers (e.g., Dymond et al. 2000; Martin et al. 2016) to more specifically discuss—among all interested and geographically representative stakeholders—the extent to which scholarly over-representation from countries within the WEOG reflects a problem for the field. If others agree that it is, an international team of ABAI leaders and members could collaborate to create strategic initiatives that help to address the issue (e.g., create additional grant opportunities or specialized training related to transnational collaboration) and evaluate progress over time.

Fourth, we encourage ABAI leadership to monitor and publish membership data in ways that expand opportunities for professionals to understand international characteristics and changes of ABAI membership over time. For example, in the next version of the current handbook on affiliate chapters, it would help to report more detailed data according to each affiliate chapter, such as the total number of individuals, their primary professional roles, their geographic affiliations, and other demographics (e.g., sex, age, ethnicity).

It would likewise help to report data according to these metrics over time and by global region, rather than simply United States versus non-United States. Such data would not only help clarify the "international" presence of ABAI members but would also allow for the comparison of important metrics related to internationalization, (e.g., internationally representative scholarship and changes over time).

Fifth, leaders of behavior analytic journals are encouraged to assess and discuss data on international publication trends, evaluate whether international scholarship is a priority for the journal, and, if it is, decide on plans of action that could be taken to improve international representation. For example, editorial teams could monitor manuscript submissions from major global regions and the outcomes of those submissions (e.g., rejected or published); then, based on such assessment data and the journal's commitment to improving internationally representative scholarship, journal teams could evaluate the extent to which certain actions or "interventions" lead to better geographical representation of manuscripts received and published. As noted earlier, additional recommendations for journal editors have been described elsewhere, including: (a) promoting special issues within the journal that focus on underrepresented countries or geographic regions and soliciting manuscript submissions from researchers in underrepresented countries or regions (Begeny et al. 2018b); (b) explicitly stating the publication mission (e.g., does it strive to publish representative international scholarship?) and including information to clarify the often implicit expectations about "quality" manuscript (van de Vijver 2013); and (c) translating published research into major world languages in order to make the work more accessible to colleagues around the world (Martin et al. 2016).

Limitations and future research directions

One limitation of this study is that we did not examine all article characteristics related to international scholarship. For instance, we did not examine the specific types of scholarship (e.g., conceptual papers, applied studies) published within the journals and whether scholarship type is in some way influenced by authors' geographic affiliation. Likewise, we did not examine patterns of collaboration among authors from different countries or different geographic regions—which is another area of future research that may clarify international publication patterns or ways to increase underrepresented authors or participants. Furthermore, future research might explore the extent to which the geographic affiliation of editorial board members influences international representation within a journal.

Additionally, although we evaluated a relatively large number of journals, we did not fully analyze articles from all journals that publish behavior analytic work. For example, journals that were in operation for less than 15 years were excluded from our study, representing a potential limitation that should be addressed in future research. Similarly, although our search procedures for journals were comprehensive, they were not exhaustive, and it is possible we did not identify otherwise includable journals.

Conclusions

Across 10 major behavioral journals, the vast majority of articles were written by authors from Western Europe and the United States, with very small percentages of articles reflecting authors or participants affiliated with countries in Asia, Africa, and Eastern Europe. We echo the concerns voiced by previous researchers exploring this topic of international

publication patterns in behavior analysis. As Dymond et al. (2000) aptly worded it, "Assuming that behavior analysts are interested in furthering international involvement in their science … the present trends should be of concern" (p. 341). Unfortunately, more than 15 years after the Dymond et al. (2000) study, the patterns found in our study still highlight similar concerns.

Despite our findings, there are some positive indicators of international growth in behavior analysis, particularly with respect to membership in ABAI and to a smaller degree within the scholarship. Indeed, continued internationally-focused efforts from ABAI, as well as previous evaluations of international publication trends in behavior analysis, indicate that global representation is a cause that is important to many professionals in the field. Continued stronger efforts should increase the likelihood that scholarship in behavior analysis adequately reflects a geography beyond the United States and other countries within the Western world.

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