

Are Brazilian Behavior Analysts Publishing Outside the Box? A Survey of General Science Media

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Published online: 11 October 2016
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Abstract Recent studies have stressed the importance of disseminating behavior analysis to a more diverse audience and have provided ways to do so effectively. General science publications offer an attractive venue for communicating with a scientifically educated public. The present study examines behavior analysis research published in *Science Today* and *Research Fapesp*, monthly general science publications published by the Brazilian Society for the Advancement of Science and São Paulo Research Foundation, respectively. Behavior analytic terms were searched in issues published from 2003 to 2014, along with psychoanalytic terms as a comparative measure. Only 13 behavior analysis articles were found, while psychoanalytic articles totaled 150. Six of the behavior analysis articles misconstrue fundamental concepts of behavior analysis. The study recommends that behavior analysis researchers extend the dissemination of their findings outside the box.

Keywords Dissemination · General science · Publication · Behavior analysis

It has been more than eight decades since Skinner established the foundations for the science of behavior analysis (Skinner, 1938). Since then, behavior analysts have investigated subjects such as memory, language, decision making, pharmacology, gerontology, and developmental disabilities from empirical and theoretical perspectives (Madden, Dube, Hackenberg, Hanley, & Lattal, 2013a, 2013b). By taking a closer look at the

antecedents to consequences of present and past behaviors and their contingencies, behavior analysis has broken with the ancient custom of seeking behavioral causes within individuals and introduced a revolutionary way of thinking into psychology.

In view of the potential social impact of such a circumstantial approach, it is reasonable to ask how, when, and whether the findings of behavior analysis (BA) research are being disseminated to the broad spectrum that could benefit from them. At the same time, it is important to note that the discipline itself can be positively affected by disseminating its findings to a more diverse audience, in other words, by getting out of its box. In addition to the well-documented and widely acknowledged advancements that behavior analysis has contributed to the treatment of people diagnosed with autism spectrum disorder (Foxy, 2008; Hayward, Gale, & Eikeseth, 2009; Matson, Tureck, Turygin, Beighley, & Rieske, 2012; Peters-Scheffer, Didden, Korzilius, & Sturmey, 2011; Virués-Ortega, 2010), two further examples illustrate this impact, and an additional uncommon case can be found in Maple and Segura (2015).

First, prompted by Mischel, Ebbesen, and Raskoff Zeiss (1972), behavior analysts Grosch and Neuringer (1981) performed an experiment in which Mischel's well-known marshmallow paradigm was successfully tested with non-human subjects, indicating the significance of environmental variables in self-controlled behavior. Such findings encouraged the behavioral study of self-control, a line of research that has proven invaluable (Rachlin, 2009). Second, behavior analysis can contribute to the study of complex behavioral phenomena such as corruption, traditionally a domain of economists and political scientists (Abbink, 2000; Armantier & Boly, 2008; Frank & Schulze, 2000). Its contribution can involve elucidating controlling variables of operant behavioral classes that compose corrupt behavior at individual and

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cultural levels, thus facilitating the dissemination of the operant approach to areas primarily grounded in cognitive processes (Agbota, Sandaker, & Ree, 2015; Fernandes & Pezzato, 2015; Goldstein & Pennypacker, 1998). In return, behavior analysis may attain greater visibility and influence the political process, perhaps to the point of informing public policies (Hursh & Roma, 2013; Thaler & Sunstein, 2009).

Following this path, wider dissemination may yield at least three highly desirable outcomes. First, it can empower BA scholars in academic and political settings by highlighting the relevance of their research. Second, it can enhance the impact of their published work among scholars from different disciplines interested in the topics they treat. Finally, it can expand employment opportunities for behavior analysts based on increased public acceptance of their approach to dealing with social challenges (Michael, 1980; Normand, 2014; Schlinger, 2014a).

Despite the evident benefits of wider dissemination, however, behavior analysis has a paradoxical history in this regard, as shown in a detailed historical analysis by Cruz (in press). On the one hand, BA practitioners represent a growing community with broad international representation (ABAI, 2016) and reputable professional certification (BCBA, 2016). On the other, since its foundation, behavior analysis has been haunted by the specter of isolation (Catania, 2008; Herrnstein, 1987; Laties, 1987, 2008; Lindsley, 1987; Skinner, 1987). Isolation occurs inside the BA community, for example, when researchers from different areas and practitioners are unaware of each other's studies, methodologies, and practices (Diller, Salters-Pedneault, & Gallagher, 2014; Elliott, Morgan, Fuqua, Ehrhardt, & Poling, 2005; Poling, Alling, & Fuqua, 1994; Poling, Picker, Grossett, Hall-Johnson, & Holbrook, 1981). A more optimistic perspective, however, can be found in Virues-Ortega, Hurtado-Parrado, Cox, and Pear (2014). Isolation also occurs between behavior analysis and general psychology (Coleman & Mehlman, 1992; Hearst, 1967; Himeline, 1980; Krantz, 1971, 1972). As a consequence, critics of the former have characterized BA as a closed, restrictive, and even perishing community (Hearst, 1967; Rutherford, 2009; Wendt, 1949), although some have rebutted such claims (Roediger, 2004). Such isolation strongly influences persistent discussions on BA life expectancy (Baum, 2000; Carr, 1996; Fantino, 2008; Hayes & Fryling, 2015; Michael, 1980; Poling, 2010; Vyse, 2013; for an entire issue on the topic, see Holth, 2014) and calls for equipping and encouraging behavior analysts to disseminate their findings more broadly (Bailey, 1991; Freedman, 2015; Smith, 2016).

Recently, ten articles reflecting on the benefits and challenges of disseminating BA research were published. Becirevic (2014) surveyed respondents on BA social media websites and found many agree that it is imperative to address misrepresentations and misunderstandings of their field. They failed, however, to indicate any concrete steps to do so

effectively. In response, three experts shared maxims for dealing with BA misunderstandings, e.g., be evidence based (Critchfield, 2014), draw on relevant sources to craft an effective response (Todd, 2014), and use strategic approaches, such as determining the context in which misconceptions have emerged and correcting them in a non-argumentative manner (Zarcone, 2015). Another expert highlighted the importance of high-quality graduate training in developing communication skills (Schlinger, 2014b).

Another five case studies address the benefits and challenges of publishing outside the box. The authors provide valuable advice and indicate pertinent publications for BA researchers to consider in disseminating their findings to a more diverse audience (Morris, 2014; Reed, 2014). One option to reach scholars from different fields is to publish articles in scientific journals of other disciplines (Friman, 2014b). Another, targeting an even broader readership, is to publish books in the popular press that provide a comprehensive panorama of BA principles and procedures in language that is more accessible than the abstruse jargon that too often marks scientific literature (Vyse, 2014). Yet another option that could reach both scholars and well-educated laymen is to disseminate BA advances via general science publications, magazines, and newspapers (Schlinger, 2014a).

General science publications are particularly attractive venues given that their readership is largely composed of scholars, practitioners from diverse disciplines, and other readers interested in science. It is an effective means of disseminating behavior analysis' empirical discoveries and its philosophical comparisons and contrasts with other approaches (Schlinger, 2014a).

Among Brazilian general science publications, two merit particular attention: *Science Today* and *Research Fapesp*. The first is published by the Brazilian Society for the Advancement of Science which constitutes Brazil's major scientific society, comprising over one hundred associations from all scientific disciplines. The second is published by the São Paulo Research Foundation, Brazil's major scientific research foundation, which promotes national and international scientific collaboration and funds research at multiple levels, with a budget exceeding \$300 million US dollars in 2015.

Brazil's BA community is second only to the USA in size, with high-quality researchers that publish in national and international scientific journals (Todorov & Hanna, 2010). Considering only national publications, a search of the principal BA journal and book databases (viz., *Behavior under Focus*¹; *Brazilian Journal of Behavior Analysis*; *Brazilian Journal of Behavioral and Cognitive Therapy*; *Perspectives in Behavior Analysis*) indicates some 450 published articles over the past decade (2006 to 2015). Despite this considerable

¹ *Comportamento em Foco*—authors' translation.

academic productivity and initial BA dissemination during the 1960s (Matos, 1998), isolation also impacts Brazil (Andery, 2012; Cruz, Strapasson, & Rebecca, *in press*; Rodrigues, 2006).

With this contrast of growth and isolation in mind, it is reasonable to assume that Brazilian behavior analysts have relevant material to share with a broader audience and could benefit from doing so. Moreover, as previously indicated, *Science Today* and *Research Fapesp* are optimal venues to achieve these ends. Accordingly, the present study examines BA research published in *Science Today* and *Research Fapesp*.

Method

To identify BA articles published between 2003 and 2014, searches of *Science Today*'s and *Research Fapesp*'s online databases were conducted. While two issues from the former (numbers 220 and 297) were not analyzed due to problems in the database, the remaining 130 and all 132 issues from the latter were analyzed. Occurrences that did not relate substantively to behavior analysis, e.g., behavior of chemical compounds, were not analyzed.

Search terms were selected using a Brazilian BA vocabulary index (Teixeira Junior & Souza, 2006). Twelve commonly used technical terms (behavior, behaviorism, behavioral therapy, cognition, conditioning, contingency, operant, punishment, reflex, reinforcement, respondent, stimulus control) and four leading researchers (Hull, Skinner, Tolman, Watson) were selected. In a preliminary phase, the terms were searched in 30% (78) of the *Science Today* issues. Only two technical terms (behavior, behaviorism) and one researcher (Skinner) were found in all retrieved instances. Accordingly, these terms were searched in the 262 issues of *Science Today* and *Research Fapesp*.

As a comparative measure, using terms common to psychoanalysis derived from a psychoanalytic vocabulary index (Laplanche, 2001) and a general dictionary (Houaiss, 2008), viz., “psych,” “psychoanalysis,” and “Freud” was searched. As an additional control measure, 35% (92) of the issues were then searched using the term “psychology.” However, this search did not indicate any publications not previously retrieved using the original BA and psychoanalytic search terms. The occurrences were grouped into four categories: psychoanalysis—*Research Fapesp*, psychoanalysis—*Science Today*, behavior analysis—*Research Fapesp*, and behavior analysis—*Science Today*.

Following these analyses, 40% of the reviewed issues (52 from *Science Today* and 53 from *Research Fapesp*) were analyzed to establish interobserver agreement by comparing BA and psychoanalytic occurrences identified by two independent observers. When a disagreement occurred, it was discussed

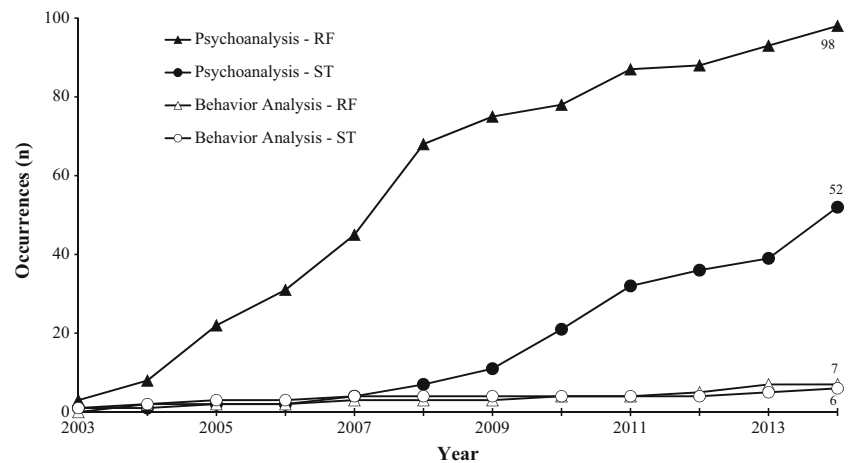
and the article was included only if both observers concurred. The rate of agreement was calculated by dividing total agreements by total agreements plus disagreements, and the result converted to a percentage. The total interobserver agreement for both publications was 93%, with four disagreements pertaining to psychoanalysis and none to behavior analysis. Regarding the disciplines reflected in Figure 2, occurrences from 20% of the reviewed issues (26 from *Science Today* and 26 from *Research Fapesp*) were analyzed to establish interobserver agreement. Following the procedure previously described, the total interobserver agreement for both publications was 98%, with one disagreement pertaining to the discipline assigned to a psychiatrist that is associated to a psychology department.

Results and Discussion

During the study period, 13 BA articles were published (six in *Science Today* and seven in *Research Fapesp*). Figure 1 depicts the cumulative number of publications involving the selected terms over the study period for each category. In regard to the six articles published in *Science Today*, two were published in the section titled “Memory,” which is devoted to discussions about significant scientific events. The first notes the importance of Pavlov’s findings on respondent conditioning in development of the experimental analysis of behavior (Pessoti, 2003). The second offers reflections on the impact that Watson’s manifest (Watson, 1913) had on rejection of introspection and development of alternative methodologies to investigate psychological phenomena in an objective, and experimental fashion (Cirino, 2013). Another is a letter to the editor written by the present study’s first author in response to a physicist’s article about the limitations of science. The letter elucidates the advantages of identifying science as the behavior of scientists in relation to measurable and controllable environmental contingencies (Dal Ben, 2014).

The remaining three articles misrepresented Skinner’s proposals on language and verbal behavior (Skinner, 1957), while embracing Chomsky’s proposals on universal grammar (Chomsky, 1959). Szczesniak (2004, 2007) and Balão (2005) present Skinner’s proposal as being grounded in the stimulus-response paradigm, instead of the multiple-controlled operant paradigm, and developments in verbal behavior analysis (e.g., empirical and theoretical research published in the journal *The Analysis of Verbal Behavior*) were not discussed. Although no letters were published in subsequent issues of *Science Today* in response to these articles—ironically resembling Skinner’s silence in regard to Chomsky’s criticism, publically addressing such misunderstandings provides an excellent opportunity to educate authors and readers by correcting published errors and indicating reliable sources of information (Becirevic, 2014; Critchfield,

Figure 1. Occurrences of psychoanalysis and behavior analysis terms on *Science Today* (ST) and *Research Fapesp* (RF)



2014; Friman, 2014b; Hobbs, Cornwell, & Chiesa, 2010; Schlinger, 2014b; Todd & Morris, 1983; Todd, 2014; Zarcone, 2015).

Regarding the seven BA articles published in *Research Fapesp*, two were published in the section titled “Research,” which announces scientific discoveries. Zorzetto (2013) reports advances in the treatment of obsessive-compulsive disorder, in which the use of medication and behavioral therapy is the recommended practice for changing how a person perceives and acts out the disorder. Zolnerkevic (2013) reports findings from a collaborative endeavor among Brazilian and Australian researchers on differing abilities to perform simple and conditional discriminations by diverse species of bees that raise questions regarding the role of survival contingencies in such distinctions.

An unattributed article (FAPESP, 2004b) pays tribute to Carolina Bori’s labors to establish psychology as a scientific discipline and profession in Brazil. In so doing, it recognizes her efforts to enhance teaching methods for spreading scientific critical thinking to the general public, which, she believed, is the primary social contribution of science. The remaining three articles concern a curriculum to develop children’s social abilities, an open access digital collection of classical psychology authors, including Skinner, and activities of the National Institute of Science and Technology for Behavior, Cognition and Teaching, which focus on behavior analysis (FAPESP, 2004a, 2007; Marques, 2010, respectively). Finally, in the section titled “Tales,” a historical fiction about an unhappy psychology graduate student depicts Skinner’s and Pavlov’s experimental control and basic research with non-humans as a denial of human superiority and freedom as compared to the concepts of self-realization and personal freedom advanced by Carl Rogers and Wilhelm Reich (Castelo, 2012).

The number of psychoanalytic articles published during the study period was 6.5 and 14 times higher than their BA counterparts in *Science Today* and *Research Fapesp*, respectively.

An average of 4.3 and 8.1 psychoanalytic articles were published annually in *Science Today* and *Research Fapesp*. In some years (2010, 2011, 2014 for *Science Today* and 2014 for *Research Fapesp*), the number of psychoanalytic articles spiked; however, no specific reasons for this occurrence, such as a special section or issue, were identified. Psychoanalytic mentions were present in virtually all sections of both publications (Articles, Interviews, Letters, Memory, Research, Tales, etc.).

In summary, during the study period, there was only one published article reporting BA basic research findings (Zolnerkevic, 2013), one letter to the editor describing BA approaches (Dal Ben, 2014), and two articles related to BA as a means of clinical and educational intervention (Zorzetto, 2013; FAPESP, 2004a, respectively). Four of the articles were related to BA history, generally recalling significant discoveries derived from the respondent paradigm (Cirino, 2013; FAPESP, 2004b, 2007; Pessoti, 2003). On the other hand, Balão (2005), Castelo (2012), and Szczesniak (2004, 2007) presented misconstrued and outdated information regarding behavior analysis but did not receive a single response from behavior analysts. In view of the dearth of published articles on scientific and technological advancements derived from the operant paradigm, unanswered misinterpretations, and the disproportion between psychoanalytic and behavior analysis representation, it is reasonable to suggest that behavior analysts have underused *Science Today* and *Research Fapesp* as outlets for disseminating BA research to a broader audience.

Critics might present at least four arguments suggesting limitations to the present study. First, it is possible that the selected terms did not retrieve all BA and psychoanalytic articles. Second, the study may not provide a comprehensive picture of BA dissemination in Brazil, given its focus on general science media, while excluding other dissemination strategies, such as publishing in journals from other disciplines or popular press books. Third, the topics addressed by the

publications analyzed in the study may be unrelated to subjects of interest to behavior analysis, thus limiting opportunities for dissemination. Fourth, comparing publication of BA and psychoanalytic research may be misplaced as instances of the latter likely exceed those of the former for several reasons, such as greater number of researchers, studies, and broader acceptance in the popular culture.

Regarding the first argument, an alternative means of selecting search terms would be to use a word counter, such as Coh-Metrix (McNamara, Louwerse, Cai, & Graesser, 2013), which indicates such aspects as concreteness, imageability, and meaningfulness (Diller, Salters-Pedneault, & Gallagher, 2014). Such tools, however, are not culturally relevant to Brazil as their sources are based on a culture quite distinct from its own. For instance, behavior analysis is far more prevalent in America's popular culture than Brazil's (e.g., Seinfeld, *The Big Bang Theory*, *Breaking Bad*; for a top 10 list, see McCulloch, 2015). Furthermore, as previously delineated, the search terms used were selected on the basis of analysis of relevant indexes and their efficacy was tested in pilot searches.

Concerning the second critique, the authors agree that the study's data should be combined with data from other dissemination strategies to provide a broader spectrum of BA dissemination in Brazil. Nonetheless, no substantive change in the low dissemination scenario presented in this study would be anticipated. As noted, BA isolation, diversity, and survival are persistent topics of concern (Baum, 2000; Carr, 1996; Fantino, 2008; Hayes & Fryling, 2015; Holth, 2014; Lindsley, 1987; Michael, 1980; Poling, 2010; Vyse, 2013). However, as previously mentioned, at least ten articles on BA dissemination strategies intending to equip and stimulate behavior analysts to augment such scarce endeavors have been published (Becirevic, 2015; Normand, 2014).

In response to the third argument, a random search on any issue of the surveyed publications will reveal several topics to which behavior analysis could contribute, such as climate change, aging, memory, language, human development, evolution, and cultural organization. In addition, during the study period, *Science Today* and *Research Fapesp* published articles (numbers 270 and 184, respectively) on autism spectrum disorder, a major topic in applied BA research, whose contributions to effective interventions are well documented (Foxy, 2008; Hayward, Gale, & Eikeseth, 2009; Ingvarsson, Cammilleri, & MacIas, 2012; Matson, Tureck, Turygin, Beighley, & Rieske, 2012; Peters-Scheffer, Didden, Korzilius, & Sturmey, 2011; Rivard, Terroux, & Mercier, 2014; Virués-Ortega, 2010). Despite this record, however, psychoanalysts were the only representatives of the psychology profession selected for interviews.

In regard to the premises posited in the fourth argument concerning disproportionate coverage of psychoanalytic versus BA research in the general science publications reviewed,

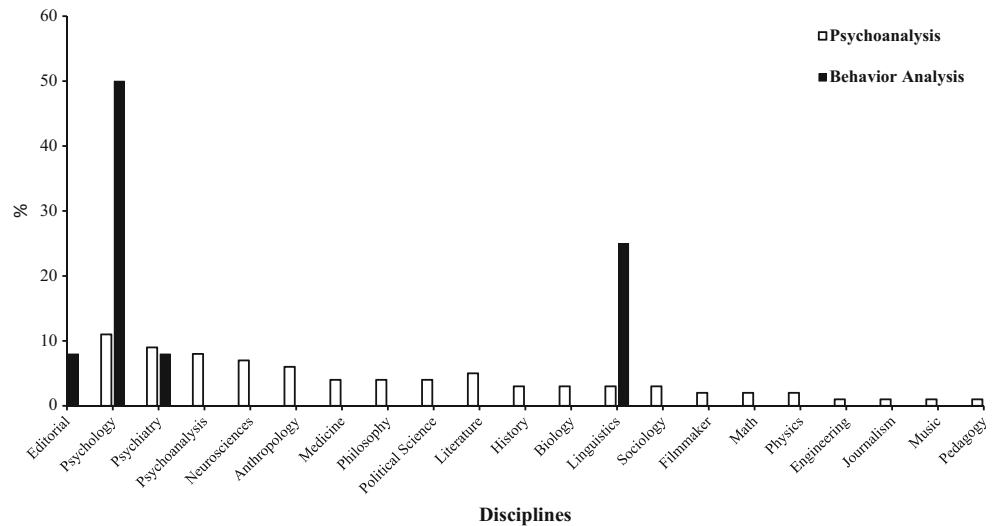
three dimensions may help frame our analysis: the number of Brazilian psychoanalysts and behavior analysts, the academic production of each community, and the disciplines represented by the published articles. Given that both behavior analysis and psychoanalysis are psychological approaches that guide professional practice in Brazil, the most direct way to measure the relative numbers of their practitioners would be to consult the affiliation directory of the Brazilian Federal Council of Psychology, which regulates psychology as a profession. Unfortunately, the Council does not record this data nor does it provide related information such as type of interest group (e.g., such as APA divisions) that could facilitate identification of their affiliates' disciplines (Federal Council of Psychology, personal communication, July 1, 2016). Moreover, while efforts are underway in Brazil to establish a certification process for behavior analysts, presently there are no well-established certifications for either behavior analysts or psychoanalysts. Accordingly, as an alternative measure, albeit less reliable, the memberships of BA and psychoanalytic associations were tallied. For the study period, aggregate memberships totaled 1196 (ABPMC, 2016; ACBr, 2016) and 1578 (FEBRAPSI, 2016), respectively. In other words, while psychoanalytic membership was slightly larger than BA membership, the number of members was relatively equivalent and thus adequate for the study's comparison.

Despite their similar numbers, however, it is possible that studies of psychoanalysts are more prevalent in peer-reviewed journals than those of behavior analysts. As previously stated, approximately 450 articles were published in Brazilian BA journals over the last decade. A search of the Scielo database² for the same period, using the term "psychoanalysis," yields approximately 500 articles, a number comparable to the figure cited in the prior sentence. Using these numbers as denominators, the aggregate of peer-reviewed psychoanalytic articles was followed by 0.33 occurrences in the general science publications reviewed in this study, as compared to only 0.03 occurrences for BA articles.

Although their community size and academic production are similar, it could be the case that psychoanalysts are more engaged in addressing the public and disseminating their findings than behavior analysts. To assess this, the disciplines related to all articles reviewed were identified, as depicted in Figure 2. Behavior analysis was cited by authors of four disciplines, primarily psychologists (50%) and linguists (25%), and, as noted, in one instance in an unattributed article. Psychoanalysis, on the other hand, was mentioned in editorials (21%) and by authors from 20 disciplines, primarily psychology (11%) and psychiatry (9%). The marked difference in dissemination across disciplines is further highlighted when comparing the percentage of articles by disciplines directly

² Scielo—Scientific Electronic Library Online is the main scientific database in Brazil that includes more than 3000 Brazilian scientific journals.

Figure 2. Percentage disciplines in found occurrences on *Science Today* and *Research Fapesp*.



related to behavior analysis, viz., psychology and psychiatry (58%), to those related to psychoanalysis, to wit, psychology, psychiatry, and psychoanalysis (28%). It is worth noting that most psychoanalytic articles (72%) arise from disciplines not directly related to psychoanalysis.

As in the Brazilian context, BA and psychoanalytic community size and academic production are similar; these three dimensions enable us to frame and evaluate the study's comparison. At the same time, the fact that most psychoanalytic articles were written by authors from disciplines not directly related to psychoanalysis reflects its broader cultural acceptance. This phenomenon is not limited to Brazil. For instance, in their analysis of thousands of digital books, Michel et al. (2011) found that Freud was cited more frequently than Galilei, Darwin, and Einstein. This prevalence provides compelling evidence for the imperative of disseminating the findings of BA research to a broader audience that extends beyond the comparatively limited readership of scientific journals.

In this sense, as Normand (2014) aptly described, behavior analysis has redefined psychology and redesigned its experiments. As it has renamed and expanded the vocabulary of psychology, its scientific precision and specialized lexicon may render dissemination of its research more challenging than that of other psychological disciplines (Hineline, 1980). Nevertheless, interacting with mass media is an increasing practice within sciences with comparable rigor and terminology, such as epidemiology and stem cell research (Peters et al., 2008).

If behavior analysts agree that disseminating a scientific explanation of human behavior that enables us to address social challenges, such as climate change, effectively is a worthwhile endeavor, they are faced with two options. They can bemoan the fact that popular culture disregards their views and thus perpetuates the isolation specter, or they can adopt

a proactive approach to remedy the situation by disseminating their findings more broadly. Indeed, as Carr (1996, p. 263) has affirmed, "Until we make it clear that we too cherish society's highest values, speak its language, and are sensitive to its political yearnings, we should expect to be ignored; and, we will be."

Disseminating reliable data and effective interventions that address society's challenges is a sound way to gain cultural acceptance. Fortunately, we can climb the shoulders of prominent authors, whose advice is invaluable in pursuing such an endeavor (Allen, Barone, & Kuhn, 1993; Critchfield, 2014; Freedman, 2015; Friman, 2014a; Morris, 1985, 2014; Normand, 2014; Reed, 2014; Schlinger, 2014a; Smith, 2016; Todd, 2014; Vyse, 2014; Zarcone, 2015). The reason why Brazilian behavior analysts do not publish outside the box, however, does not lie primarily in their unawareness of BA isolation, potential media, or dissemination strategies but in the absence of contingencies of reinforcement for dissemination. Given the publish-or-perish imperative (Waters, 2004), professors and postgraduate students, who are in optimal position to disseminate their research, tend to focus on peer-reviewed publications, i.e., inside the box.

In the spirit of Don Quixote, we could propose structural changes to academic practices that would promote more universal dissemination. However, the authors believe there are three practical ways to attain this end within direct reach of Brazilian behavior analysts. First, researchers from other disciplines should be invited more frequently to BA conferences, as is done in ABAI conferences. Second, discussion of BA isolation and dissemination strategies should be included in postgraduate curricula. Third, course credits should be awarded for such dissemination.

The present study indicates that there is ample room for disseminating behavior analysis in Brazil. The authors strongly recommend that behavior analysts take a close look into

contingencies of reinforcement that promote dissemination and take advantage of the previously cited studies to initiate serious and sustained outreach outside the box. Although this may prove to be an arduous task, it is clearly worth the effort and will undoubtedly generate unforeseen dividends.

Acknowledgments The authors wish to express their appreciation to Robson N. Cruz for his insights in behavior analysis isolation history and to three anonymous reviewers for their careful analysis. The second and the third authors were supported with a doctoral and a master fellowship, respectively, from São Paulo Research Foundation (n° 2013/16564-0 and 2014/15457-9, respectively).

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Statement In regard to the manuscript “Are Brazilian Behavior Analysts Publishing Outside the Box? A Survey in a General Science Media,” the authors declare the following:

1. All authors have made equal contributions to the research and are equally responsible for it.
2. The manuscript has not been submitted to any other journal.
3. The manuscript has not been published previously.
4. There is no potential conflicts of interests, financial or not, regarding the research.
5. All procedures were in accordance with the ethical standards of the institutional committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. There were no human participants in the study.

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