

*EVALUATING THE FUNCTION OF APPLIED
BEHAVIOR ANALYSIS: A BIBLIOMETRIC ANALYSIS*

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Analysis of scholarly citations involving behavioral journals reveals that, consistent with its mission, applied behavior analysis research frequently references the basic behavioral literature but, as some have suspected, exerts narrow scholarly influence.

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Although applied behavior analysis (ABA) was conceived as a general approach to redressing behavior problems, from the field's earliest days until the present, concerns have been raised about whether ABA subsumes a sufficiently broad range of methods and socially important behaviors (e.g., Baer, Wolf, & Risley, 1968; Critchfield & Kollins, 2001; Friman, Hayes, & Wilson, 1998). This matters because a field with limited focus may gain a limited audience, and perhaps, as a consequence, even compromise its autonomy as a scholarly movement. After surveying the field's recent contributions, for instance, Hayes (2001) worried that ABA "is gradually becoming a subfield of developmental disabilities" (p. 61).

Although it is true that persons with developmental disabilities are often the focus of ABA investigations, a field's scholarly impact is not necessarily defined by its subject pool. The present report is concerned with the audience reached by ABA research, which in turn helps to characterize the functional role of ABA in a broad community of scholars. Bibliometric methods were used to identify patterns of scholarly citations involving the *Journal of Applied Behavior Analysis (JABA)* and several other

behavioral journals. Although experts debate the specific factors that determine citation rates (Garfield, 1972), at the most general level citations provide a face-valid and objective estimate of who is noticing whom. Previous citation analyses have described molar citation trends (e.g., overall citation rates) for a few behavior-analytic journals (e.g., Krantz, 1971). A detailed description of citation relations among journals can illuminate more specific patterns of scholarly influence.

METHOD

Behavioral journals were identified by consulting a published list of such journals (Wyatt, Hawkins, & Davis, 1986), reference lists of published articles, Web pages of behavioral organizations, and on-line abstracting services. Behavioral journals were considered to be those with an explicit mission of exploring issues relevant to behavior analysis (e.g., *JABA*) and those with an eclectic mission but a history of very regularly publishing articles on a behavior-analytic theme (e.g., *The Psychological Record*). No attempt was made to distinguish between styles of behavioral emphasis (e.g., *JABA* vs. *Cognitive and Behavioral Practice*) or to identify all possible behavioral journals.

In all, 31 behavioral journals were identified, and extensive citation data could be

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obtained for 14 of these¹ (see Figure 1) from the 1997 *Journal Citation Reports on CD-ROM (JCR)*, a feature of the *Social Science Citation Index* (Philadelphia: Institute for Scientific Research). The *JCR* is based on thousands of sources (Garfield, 1972) and provides detailed citation data for about 1,500 social science journals, including the sources citing, and cited by, each journal. Each *JCR* edition reports data from a 2-year interval, which may seem brief, but journal citation patterns tend to be quite stable across time (e.g., see Garfield, 1972).

Using the *JCR*, two kinds of citation relations were examined: those among the 14 behavioral journals, and those between behavioral journals and other periodicals. A relation was defined as one journal providing $\geq 2.5\%$ of another's total citations. This was viewed as a relatively inclusive criterion given that the median for relations between pairs of behavioral journals was about 4%.

RESULTS AND DISCUSSION

In Figure 1 (top), lines connect pairs of behavioral journals for which a citation relation, as defined above, was identified. The data suggest two distinct mutual-citation networks representing basic science and applied areas (ovals), the integrity of which is evidenced by greater prevalence of within-cluster versus between-cluster relations. Overall, the basic science cluster incorporat-

ed more relations, involving more shared citations, than the applied cluster.

Of special interest in Figure 1 is the status of *JABA*, arguably the flagship journal of ABA research. Consistent with the goal of employing laboratory-based principles (Baer et al., 1968), *JABA* articles often cited the *Journal of the Experimental Analysis of Behavior*, but *JABA* tended to have little influence on other applied behavioral journals. The latter outcome is clarified by Figure 1 (bottom), which shows citation relations among the various applied behavioral journals and outside journals. *JABA* was linked exclusively to education and developmental disabilities sources, whereas other applied behavioral journals were linked mainly to clinical psychology sources, suggesting two functionally independent subclasses of applied journals. None of the seven applied clinical journals was strongly associated with any specialty area other than education and clinical psychology, perhaps suggesting narrow influence for the cluster overall.

Although behavioral psychology has been characterized as insular because of frequent self-citation in behavioral journals (e.g., Krantz, 1972), Figure 1 shows that in most cases behavioral journals in the applied clinical cluster cited other journals proportionally more than vice versa. This finding could reflect unexpected interest among behavioral researchers in sources outside the field. Alternatively, it could indicate that outside scholars simply lack enthusiasm for recent applied behavioral research.

A branch of science, no matter how effective, serves little purpose if most investigators, practitioners, and policy makers fail to take notice (think of Gregor Mendel). ABA may well provide the tools to solve pressing problems in domains like geriatrics, athletics, resource conservation, and health management (to name only a few areas in which ABA currently is underrepresented), just as has proven to be the case in developmental

¹ Two journals, *Behavior & Philosophy* and *Journal of Organizational Behavior Management*, were indexed in *JCR* but yielded too few citations to be informative. Fifteen additional journals were not indexed in *JCR*. Note that *JCR* is not intended to evaluate all journals but instead describes a core of "influential" journals, based on the finding that about 2,000 journals account for about 95% of all scientific citations (Garfield, 1996). Some journals are excluded as derivative of, or redundant with, the core journals. ISI also considers a journal's impact, editorial standards, and degree of international participation (see <http://www.isinet.com/isi/journals/index.html>).

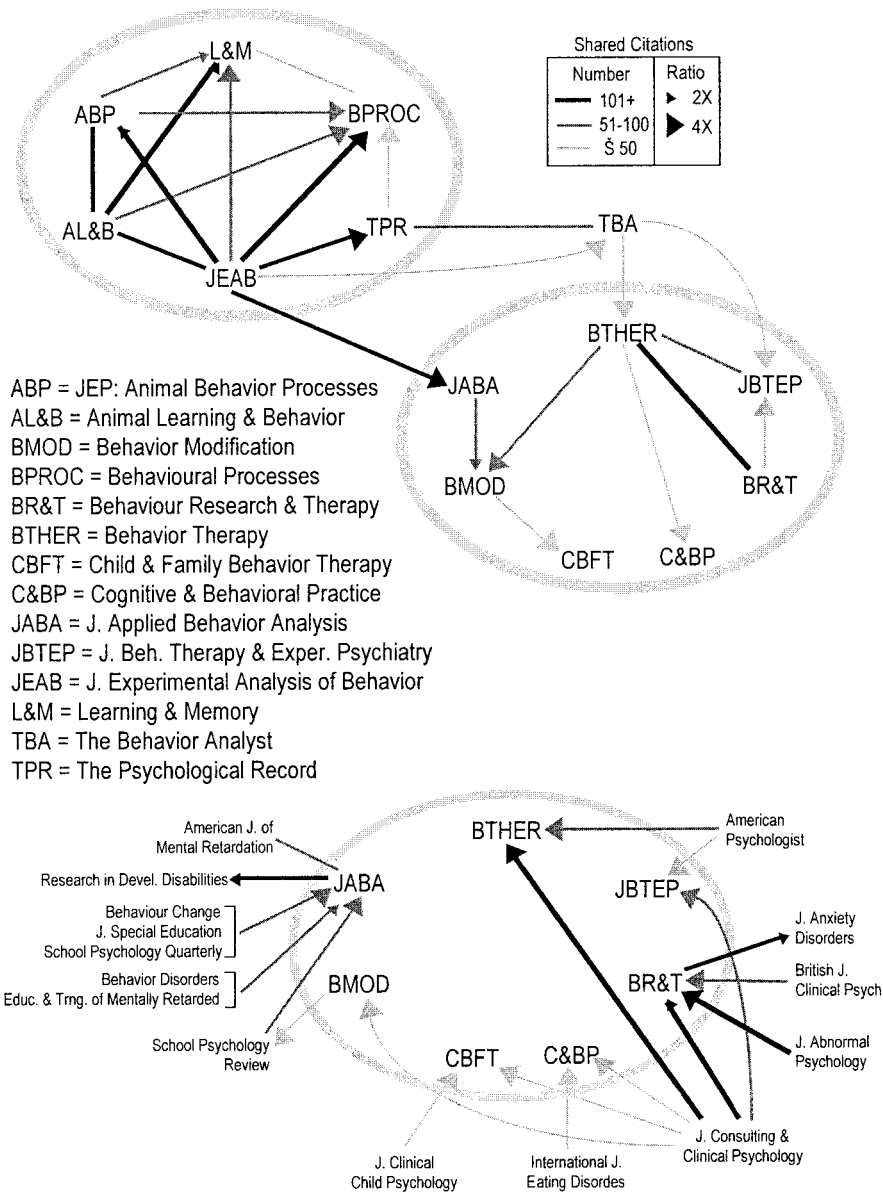


Figure 1. Citation relations among behavioral journals (top) and between behavioral journals and other journals (bottom). Line thickness reflects the number of citations shared by the pair. Arrows indicate asymmetrical relations, in which one journal cited another proportionally more often than vice versa, and show direction of influence, pointing away from the more-often cited journal and toward the citing journal. Large arrows indicate that the ratio $[(A \text{ cites } B)/\text{total citations by } A]/[(B \text{ cites } A)/\text{total citations by } B] \geq 4$. Small arrows indicate a ratio between 2 and 3.99. The absence of arrows indicates an essentially symmetrical relation (ratio < 2).

disabilities. Unfortunately, citation data provide no encouragement that scholars outside developmental disabilities tend to see it this way. Even behaviorally oriented clinical psychologists infrequently cite the ABA research

published in *JABA*. Because of ABA's limited scope of influence, workers in many areas probably are less effective than they otherwise might be, and if ABA's generality remains to be adequately demonstrated, then

individuals outside the field (who write textbooks, control extramural funding, direct political lobbying efforts, and coordinate graduate training programs) are unlikely to support its dissemination (e.g., Proctor & Weeks, 1988).

Because bibliometric methods describe, but do not explain, patterns of citation and noncitation, the present data offer no objective guidance regarding what can be done to change the status quo. Reviewers of this article proposed steps to broaden awareness of existing ABA research programs (e.g., investigators can strive to distribute their work through a greater variety of journals), but expanding the field's topical emphasis seems important as well (e.g., Friman et al., 1998). Unknown is whether enough investigators exist to systematically pursue this agenda (see Dunlap, Clark, & Reyes, 1998) or whether those who might pursue it are prepared to employ the diverse empirical methods (possibly including descriptive analyses and group-level experimental designs) that may be required to extend the strong conceptual foundations of behavior analysis to problems of broad interest (Critchfield & Kollins, 2001).

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