
Citation Indexes Can Help Halt the Spread of Fraudulent Research

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Last May at the American Medical Association's International Congress on Peer Review in Biomedical Publication, I presented a report on the impact of fraud on scientific literature. Much of the current debate on this issue has focused on the small, but growing, number of papers reporting falsified research that escape the traditional quality control filter of peer review. But little attention has been paid to the question of whether and how these papers impact on research. This question is relevant at a time when journal editors are debating what, if anything, they can and should do to prevent the publication of falsified research.

Drummond Rennie, West Coast Editor of the *Journal of the American Medical Association* and director of the AMA Congress, suggested that I examine the work of Stephen E. Breuning, the first researcher to have been convicted of scientific fraud in federal court. While at the Coldwater Regional Center for Developmental Disabilities, Michigan, and the University of Pittsburgh, Breuning published a number of studies from 1980 to 1984 on the use of drugs to control hyperactive retarded

children, claiming that stimulant drugs were more effective and had fewer side effects than tranquilizers, the traditional drug therapy for retarded children.

Experts in the field claim that Breuning's work was influential and led some states to change their policies on treating retarded children. But an investigation by the National Institute of Mental Health initiated after a colleague challenged Breuning's work, concluded that he had not conducted the studies and had "knowingly, willfully, and repeatedly engaged in misleading and deceptive practices in reporting results."

We compiled data on 23 Breuning publications cited in the *Science* and *Social Sciences Citation Indexes*. From 1980 through 1988, they received 218 citations. Of these, 83 (38%) were self citations by Breuning or his coauthors. The other 135 citations were tracked over time and showed a rapid increase from two citations in 1981 to a peak of 41 in 1985. This was followed by a decline in 1986 (30 citations), 1987 (7), and 1988 (8). Nine of the 15 citations in 1987-1988 were corrections or retractions published as editorials or letters to the

editor.

The decline in citations coincided with the publication of a sharply critical review of Breuning's work in the September 1986 issue of the *Journal of Mental Deficiency Research* (M.G. Aman and N.N. Singh, "A critical appraisal of recent drug research in mental retardation; the Coldwater studies," 30:203-16). Also, the NIMH investigation was publicly disclosed in the Dec. 19, 1986 issue of *Science* (C. Holden, "NIMH review of fraud charges moves slowly," 234:1488-9). These data illustrate two important points. First, the scientific literature effectively purges itself of identified fraudulent research: Authors seem to shun work that is publicly exposed as fraudulent. This may reassure journal editors who believe it is virtually impossible to prevent fraudulent research from being published. One proposal to do that would require authors to retain their data, which would be audited randomly to uncover fraud. But the costs of such a data audit system would be considerable and perhaps

prohibitive. Instead of prevention, editors should instead focus on ways to "cure" the scientific literature of fraudulent work.

This brings us to the second point: Citation indexes can play an important role in limiting the spread of falsified research and in correcting honest errors. Explicit correction and retraction notices, when properly indexed, are obvious red flags that alert readers to erroneous or fraudulent work. Just as important are reviews, editorials, letters to the editor, and comments that may contain critical caveats about original or derivative publications.

Authors, referees, editors, and journalists should regularly use citation indexes to see if any work discussed has later been refuted, superseded, or retracted. We are justifiably outraged whenever cases of outright fraud are exposed, however rare they may be. While errors, misinterpreted data, and other forms of honest mistakes may be of minor impact, they also deserve our attention. ■