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Today's News

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Scientists Who Cheated Had Mentors Who Failed to Supervise Them

By JEFFREY BRAINARD

When young scientists fake results, their mentors—senior researchers who are supposed to train them—have neglected their supervisory responsibilities. A new study of scientific trainees caught cooking their data found that in three-quarters of the cases, their mentors had never examined the trainees' laboratory results. And two-thirds of the supervisors never taught the trainees standards for properly keeping lab notebooks.

"There was a troublingly high incidence of missing data or of no lab books at all (even in the laboratories of renowned scientists)," wrote the authors of the study, which appears in the September issue of the journal *Science and Engineering Ethics*.

The findings suggest that principal investigators and laboratory leaders should more frequently spot-check trainees' work as well as instruct them about laboratory procedures and ethics, the authors said. But the mentors need help from their institutions to do so—the senior scientists face increasing demands on their time, and many of them lack training to become effective mentors. No federal regulation or professional custom spells out clearly what training in research ethics should consist of.

The study's authors—David E. Wright and Jered B. Cornelison of Michigan State University and Sandra L. Titus of the federal Office of Research Integrity—stopped short of asserting that the lack of oversight and guidance from mentors had caused the research misconduct. A limitation of their study, they wrote, was that it included no comparison group of trainees that had not fabricated data and therefore no information about whether such trainees had received better guidance from mentors. No one knows what mix of causes lead to misconduct, they wrote.

But at the least, principal investigators and investigators might reduce the incidence by taking a few "straightforward" and "prudent" steps, the co-authors said. They expressed surprise, for example, that "there appear to be no agreed-upon standards or best practices recommending that mentors or lab directors review trainee raw data at regular intervals, whereas there should be."

Closed Cases Reviewed

The study was based on details from the case files of 45 trainees who committed research misconduct as defined by the federal government. The co-authors obtained the files from the federal research-integrity office, which oversaw investigations of the allegations by the trainees' home institutions (all 45 worked at universities) and closed the cases from 1990 to 2004. The 45 cases represented about one-third of the 158 cases completed by the office during that period.

Thirty-three of the trainees were postdoctoral researchers, and most of the rest were graduate students. About half of the 45 had started their education at foreign institutions, and most of the data cooking occurred on research they carried out jointly with their mentor.

In most cases, the trainees admitted their guilt to the research-integrity office and agreed to be barred from receiving federal research grants for up to five years. The cases involved only biomedical or behavioral research, the jurisdiction of the research-integrity office, which is part of the Department of Health and Human Services.

Training the Mentors

The co-authors pointed out that many mentors are ill-prepared to educate trainees about ethics. A survey of 2,000 laboratory directors published in 2003 found that only 33 percent said they had a mentor who prepared them very well for that role. And the size of the research teams they supervise has grown.

Perhaps more serious, many scientists are poor role models because they themselves engage in questionable research practices. A 2005 study in the journal *Nature* found that 27 percent of scientists surveyed conceded "inadequate record keeping related to research projects" (*The Chronicle*,

June 9, 2005). And a 2007 study described in the journal *Academic Medicine* reported that 56 percent of researchers admitted to cutting corners, defined as including "inadequate monitoring of research projects because of work overload."

Contrary to conventional wisdom, more-effective guidance by mentors may have little influence on trainees: The *Academic Medicine* study found that they committed acts of misconduct at similar rates whether or not they had received training in the responsible conduct of research (*The Chronicle*, November 10, 2006).

Two former scientists at the National Institutes of Health—Ned Feder and Walter W. Stewart—who notoriously crusaded against scientific misconduct in the 1980s wrote in a July letter to *Nature* that calls for better mentors missed the point.

"The academic and financial rewards of calculated, cautious dishonesty on the part of some scientific leaders" eager to win and keep federal research grants "are, we believe, all too apparent to the junior scientists they supervise," they wrote. "No amount of tutoring, stricter supervision, or courses in research ethics will fix this problem."

The shortcomings of ethics training underscore that some methods of instruction are far superior to others, said Frederick Grinnell, a cell biologist at the University of Texas Southwestern Medical Center at Dallas who founded its program in science and medical ethics.

Mr. Grinnell (who did not write any of the studies described in this article) said that many universities rely too heavily on lectures given to graduate students and postdocs outside of the laboratory setting. Those have a role, he said, but he persuaded his university that the most important training occurs when principal investigators or lab directors hold discussions with their own trainees in small groups.

"If the training is viewed as ancillary and not part of the life of practice in the lab, the students will just blow it off," he said.

Mr. Grinnell was skeptical, however, about the call by the co-authors in *Science and Engineering Ethics* for spot-checking of data. That could be enormously time-consuming and expensive, he said—and unnecessary.

He routinely talks with the five trainees and workers in his laboratory about the data they are collecting and the progress of their research, and he occasionally checks their lab notebooks for information he needs. So anyone trying to fabricate data would have to keep up an evolving fiction. Investigators who do not interact with their trainees, he said, are probably not effective managers of their laboratories.
