INSIGHTS

BY RON DAGANI

NAUGHTY SCIENTISTS

One-third of scientists in a recent survey admitted to questionable practices; should we be worried?

OKAY, THE JIG'S UP. SCIENTISTS, IT turns out, are neither perfect nor perfectly ethical. Some are flawed human beings, not unlike some businesspeople, journalists, politicians, entertainers, law-enforcement officials, and clergy (just to mention a few other groups that have been touched by scandal in recent times).

Scientists' flaws include engaging in a wide range of questionable research practices. Everyone's heard of cases of gross scientific misconduct, such as fabricating or plagiarizing results; these can end up in the headlines. But there are many other behaviors that can compromise the integrity of research, and those were thrust into the limelight earlier this month when *Nature* (2005, *435*, 737) published the results of a survey in which more than 3,200 scientists fessed up to "behaving badly."

The survey—conducted in 2002 by Brian C. Martinson of HealthPartners Research Foundation, in Minneapolis, and two colleagues at the University of Minnesota, Twin Cities—focused on early- and mid-career U.S. researchers who were supported by the National Institutes of Health. Survey respondents were asked by mail to report whether or not they had engaged in a number of behaviors during the previous three years.

One-third of the respondents said they had engaged in at least one of the 10 most serious behaviors on the list—those that a sampling of university compliance officers regarded as likely to be sanctionable. Among those "top 10" behaviors and the percentage of respondents admitting to them are the following:

- Falsifying or "cooking" research data (0.3%).
- Ignoring major rules protecting human subjects (0.3%).
- Engaging in relationships with students, research subjects, or clients that may be interpreted as questionable (1.4%).
- Using another's ideas without obtaining permission or giving due credit (1.4%).
- Failing to present data that contradict one's own previous research (6%).
- Overlooking others' use of flawed data or questionable interpretation of data (12.5%).
- Changing the design, methodology, or results of a study in response to pressure from a funding source (15.5%).

Other behaviors (not in the top 10) include inappropriately assigning authorship credit (10%), dropping data points from an analysis based on a gut feeling that they were inaccurate (15.3%), and keeping inadequate records related to research projects (27.5%).

PHOTODISC/THINKSTOCK

These findings certainly are not good news for the scientific enterprise, but they're not particularly surprising either. As the researchers note in their report: "The modern scientist faces intense competition, and is further burdened by difficult, sometimes unreasonable regulatory, social, and managerial demands. This mix of pressures creates many possibilities for the compromise of scientific integrity" that extend well beyond the official definition of research misconduct, which is "fabrication, falsification, or plagiarism [FFP] in proposing, performing, or reviewing research, or in reporting research results."

Nevertheless, the survey results are worrisome because they reveal a pervasive breakdown in the ethical practice of science. Furthermore, it's possible that these research behaviors are being underreported, with the worst offenders being reluctant to participate, despite assurances of anonymity.

But have these behaviors actually hurt science in a significant way? The survey offers no clue.

Commentators have pointed out other deficiencies of the survey. For example, many of the questions were worded so vaguely that they could also refer to actions that aren't objectionable. For example, a researcher might decide to modify the design of an experiment to improve it, based on a legitimate suggestion from a funding source. Yet in filling out the survey, a "yes" answer to this question would count as admitting to a no-no.

It's also unclear whether ethical lapses and other questionable behaviors have become more common as science has become more competitive. In the absence of retrospective data, I think it's likely that these behaviors have occurred widely for a long time—indeed, for as long as people have tried to get ahead with less work, less attention to detail, or less regard for ethics.

There are some indications, though, that certain kinds of misconduct are on the rise. For instance, chemistry journal editors are seeing a growing number of cases in which authors are trying to publish essentially the same manuscript in different journals, a practice known as duplicate submission, or are plagiarizing their own previously published papers—self-plagiarism (see page 4).

So are ethical standards collapsing? Or are many—particularly, newly minted—scientists just unaware of what's right and wrong in the lab? Further research on scientists' behaviors, particularly the factors that motivate them to misbehave, could shed light on these questions.

Also, perhaps it's time to make ethics education more widely available and even mandatory for all budding young scientists. Some universities have long offered courses or classes in research ethics (C&EN, April 26, 2004, page 33), but not everyone who should be exposed to them is.

In addition, it may be time for the official definition of misconduct in research to be expanded beyond FFP. This is a controversial notion, but it would send a strong signal that other ethical lapses will no longer be tolerated.

With any luck, such initiatives may help to curb the darker side of human nature.

Views expressed on this page are those of the author and not necessarily those of ACS.