

Karen Muskavitch's Commentary on "Truth or Consequences"

Commentary On
Truth or Consequences

As one can quickly see from scanning this case, the central issues are trust and honesty. However, the case also raises several more peripheral yet important issues, including proper data management and the responsibilities of authors, collaborating researchers and faculty research advisers.

Trust is essential for science, particularly in collaborative research settings. In fact, in 1995 an entire issue of *Science and Engineering Ethics* was devoted to consideration of "Trustworthy Research." (Vol.1, No. 4, 1995) Trust, in turn, depends on honesty, the value listed first among the core values of science. (National Academy of Sciences et al., 1995, p. 21) If someone is seen as dishonest, we do not trust him and avoid him as a collaborator. In Part 1 of this case, we are asked to consider what can happen within a research group when trust is weakened; in Part 2 we look outward to consider the possible effects within the larger scientific community.

There is no glaring instance of misconduct in this case. At most, Peter can point to a lack of primary data in Sally's notebook for the second set of mice and report that she didn't save any of the cells for reanalysis. The failure to preserve relevant data has been termed a questionable research practice, something that may be detrimental to the research process, but is not misconduct. (National Academy of Sciences et al., 1992, Vol. 1, p. 28) However, when he considers the sum of Sally's actions, Peter comes to wonder if she might have falsified or even fabricated her results from the second group of mice so that they would be consistent with those of the first. If so, her action would be misconduct. Peter must decide whether and how to act on his misgivings. Exploring his options and identifying the factors he must weigh in making his decisions are the most obvious foci for discussion of this case.

The case also could be used to trigger a discussion of best practices for the conduct

of collaborative laboratory research. The discussion group could identify what types of standard operating procedures for the laboratory could have been put into place before this incident so that the problem Peter faces would never have arisen. What if the lab agreed on norms for the number of subjects tested and/or replications to be done before publication of the results? What if there were a clearly articulated expectation that primary data will always be kept and preserved in a bound notebook? What if it were a standard part of preparing a manuscript to have all the authors sit down together to review the primary data, not just the graphs and tables generated from the data? That is exactly what some laboratories have done, but often only after a crisis. After two independent but concurrent incidents of misconduct in his laboratory, Lee Hood is reported to have "formalized the review process, so that each paper is now reviewed by three people inside the lab." In addition, "[t]here is considerably more emphasis on dealing with raw data, not merely a synopsis of the findings. And Hood now also requires everyone to keep a bound lab notebook." (Roberts, 1991, 1347)

Discussion Questions

Question 1

This question challenges us to consider what options are open to Peter, and how he might decide among them. Some possible options are 1) going ahead with the writing as if he had no misgivings, 2) confronting Sally, or 3) telling Larson that he will not prepare the manuscript until the data can be verified. Surely discussion will generate other possibilities, such as Peter loudly and without warning declaring at a laboratory group meeting that he's certain Sally has fudged her data, that he's never going to work with her again, and that others had better watch out for her. Such a course of action is clearly inappropriate because it fails to show respect for the people involved, and it could have some very serious negative consequences for a number of people, including Peter. However, brainstorming that includes such inappropriate options can help us exercise our imaginations and improve our creativity in devising innovative appropriate solutions.

Next, one must evaluate the many possible courses of action and select among them. This process involves looking at the possibilities from a number of perspectives, considering ethical principles and obligations, predicting possible consequences and making reasoned judgments that take account of conflicting interests, principles and obligations. During this part of the discussion, it is

important for participants to justify their positions, rather than falling back on "I think" or "I feel" statements. Discussants must be able to explain their reasoning so that the group can work toward a consensus on which possible courses of action are ethically acceptable, which are not, and why. Then the relative merits of the acceptable options can be evaluated to determine the best course of action. In the end, participants may differ on the best option because they will give different weights to conflicting obligations or principles.

In this scenario, Peter would need to consider the interests of such people as Sally, Larson, the rest of the lab members, and other scientists working in this field, in addition to his own. He needs to examine his obligations to these and other people, as well as the ethical principles on which these obligations are based. For instance, he has a basic obligation as a member of the human community to treat other people respectfully, as he would like to be treated. But he also has a responsibility to the scientific community in particular to honestly report the results of his research because of his respect for them, their time and their ability to draw their own conclusions from the data. These and other obligations may appear to be in conflict. Then Peter needs to examine the possible courses of action open to him to determine the possible consequences of each alternative, and evaluate how well each option fulfills his obligations and takes into account others' reasonable interests.

Discussion Questions

Questions 2 and 3

These questions focus the discussion on the responsibilities of the authors of scientific papers. For instance, how sure of your results do you need to be before you publish? In discussions of research ethics, we often focus on appropriate authorship and investigate criteria for determining who has the right to be listed as an author. The responsibilities of authorship, the flip side of this coin, often are not considered as thoroughly, probably because of the large variation in expectations.

Generally, an author is expected to take responsibility for the validity of the data presented in a paper, but there is some question as to whether one is responsible for all of the data presented, or only for the data one actually collected. In "Responsible Science," the NAS committee seems to argue for collective responsibility, saying that "the privilege of authorship should be based on a

significant contribution . . . as well as a willingness to take responsibility for the defense of the study should the need arise." (National Academy of Sciences et al., 1992, Vol. 1, p.140) The American Society for Microbiology also comes down on the side of collective responsibility, stating that when publishing in its journals, "All authors of a manuscript must have agreed to its submission and are responsible for its content . . . ASM considers all authors responsible for the entire paper." (Journal of Bacteriology, 1998, Vol. , p. I-ii) In contrast, the *Journal of the American Medical Association* indicates that "[a]uthors may include explanation of each author's contribution and add a publishable footnote explaining specific contributions," presumably to indicate who is taking responsibility for what parts of the study (JAMA, Jan. 7, 1998, Vol. 279, p. 67). As the International Committee of Medical Journal Editors has asserted, "[a]ny part of an article critical to its main conclusions must be the responsibility of at least one author" (JAMA, 1997, p. 928), but, one infers, not necessarily all. *Nature*, where the characters in this scenario plan to publish, has not published its expectations concerning the criteria for and responsibilities of authors in its "Notes to Contributors" (*Nature*, 1997, p. 702), and we do not know the conventions in the characters' field, professional organization(s) or laboratory. Similarly, the conventions for the meaning of and responsibilities of first vs. last vs. internal authors vary considerably from discipline to discipline, and even from laboratory to laboratory.

Thus, even though he is the first author, Peter may be able to indicate via a footnote in the manuscript that he accepts responsibility only for the data he collected and not for the data from the cell function assays that Sally ran. Is that course of action ethically tenable? One's answer will vary depending on one's view of the responsibilities of authorship.

This case may trigger a discussion exploring the range of variation in the criteria for and responsibilities of authors that would inform students of the very real variation and point out the benefits of discovering the local conventions before they become authors.

Discussion Questions

Question 4

Now we pause to look at the actions of Larson, the faculty member who directs the laboratory in which Peter and Sally work, and who is the principal investigator on

the grants that support the lab. In these roles, he is the person ultimately held responsible for the validity of the work done within the laboratory, and therefore is responsible for quality control. However, he is more than just the lab director: He is also the faculty adviser for Peter and Sally, two fourth-year graduate students working toward the Ph.D. As such, he is responsible for training them and helping them to develop the skills they will need to become independent investigators. Two of the ways in which he should do this are to model best practices in laboratory management, and to be explicit about how and why things are done.

One can argue that Larson acted properly when he told Sally that she would appear as the second author on Peter's manuscript if her data were informative, because he was providing explicit information as to what Sally might expect from the work she is being asked to do for Peter's project. He is also being consistent with the expectation that one is an author only if one has significantly contributed to the information presented in a paper. However, one could also argue that he is putting Sally in a difficult position, tempting her to fudge results so that her data will be seen as "informative."

That is particularly true when one notices indications that best practices are not the rule in this lab, so that tainted data may not be caught. This lab seems to have no standard procedures for recording and preserving primary data, or for storing samples for possible confirmatory analyses. Similarly, there are no routine mechanisms by which other members of the lab discuss primary data or review manuscripts. For instance, note that Larson never asks to see the raw data from Sally's analyses; he only looks at her graphical interpretations of the data. Peter didn't feel he could ask directly about the data, but instead went to look at Sally's notebook on the sly. He now seems to feel that publicly asking about the data will depart from routine lab practice sufficiently to stigmatize Sally. If a set of laboratory procedures had been in place and were routinely followed, Peter would not be in the quandary in which he now finds himself, and Larson would be publishing papers of higher quality.

Of course, this discussion does not address the very real problem of survival in the competitive atmosphere of contemporary scientific research. Many people use the time pressure as a justification for sloppy record keeping, lax laboratory oversight and over-interpretation of marginal data. However, consider all the time that the Hood lab spent sorting through the mess left after misconduct was discovered in their lab, and how much time and energy Peter is spending worrying about Sally's

data rather than writing the manuscript and doing further experiments. Best practices include not falling prey to short-term expediency.

Discussion Questions

Questions 5 and 6

Now that the paper has been published and presumably discussed at scientific meetings, any actions Peter might take will occur in a far more public context. The basic ethical considerations are the same as they were when he wrote the paper, but now some of the possible consequences are different, and an additional course of action is now possible: retracting the paper.

If this were the only paper on the function of this gene and if understanding the gene had become important for human health between Part 1 and Part 2, then one might argue that Peter's obligation to investigate Sally's analyses had increased. However, other groups have already cast doubt on the Larson lab results so that Peter's failure to act will not endanger human lives or health. This is an example of the self-correcting nature of science to which many have referred. However, it is not without cost.

Note that it is possible that Sally really did get the sample labels correct, and the first two sets of analyses were a fluke. Alternatively, the assay conditions, mice or knockout alleles studied by the Larson lab may differ from those used by other labs in some way that affects the cell function analyses. Discrepancies between labs do not always indicate fraud, and Peter needs to be careful. Until the situation is clarified, however, the Larson lab will be perceived as either sloppy or dishonest.

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