Misconduct

RCR Instruction Workshop

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available at
http://bit.ly/RCRInstruction#MisconductSlides

Warming up

- Freewriting
  - write for 2 minutes by the clock with only minimal pauses
  - writing is more important than thinking
  - write in full sentences
  - students keep their writings – can be shared or not, kept or not
- Non-quiz
  - leader gives a topic, broad or narrow
  - leader can ask students to volunteer to describe or read her or his writing
  - leader can gather writings for comments, use for a future conversation
- Neither freewriting nor non-quizzes are graded or critiqued

Non-quiz

- Write for 2 minutes on a time you cheated
- or an incident of cheating of which you know personally

What contributed to the cheat?

- particular
- abstract or general

What discourages cheating?

Early and middle science

- Ancient Mesopotamia – astronomy, mathematics, the sexagesimal (60-base) numeral system, and the 360° circle
- Philosophy: Socrates > Plato > Aristotle
  - Natural philosophy: Aristotle to the 19th century
- Patrons – Nicolaus Copernicus, Tycho Brahe, Galileo Galileo, Johannes Kepler, etc.
- Precedent – the first to discover – Galileo's anagrams
- 19th century CE – science (from Latin scientia, "knowledge")

“On the Frauds of Observers” (a)

Charles Babbage – Reflections on the Decline of Science in England

- hoaxing – creating a fictional account of scientific findings with the intention of temporarily fooling (and ridiculing) other scientists and/or the public
- forging – claiming as true observations or findings that are actually fictitious; this deception, unlike hoaxing, is intended not to be uncovered

“On the Frauds of Observers” (b)

- trimming – ‘clipping off little bits here and there from those observations which differ most in excess from the mean, and … sticking them on to those which are too small’
- cooking – the selective use of data or methods to obtain an impressive result, such as making a very large number of observations but publishing only the few that agree with each other most closely

Babbage, Charles. 1830. Reflections on the Decline of Science in England, and on Some of its Causes. London: Fellowes.

1981: “Fraud and the Structure of Science”

“There is little doubt that a dark side of science has emerged during the past decade. In ever-increasing detail, the scientific and general press have reported the pirating of papers and the falsification of data. Four major cases of cheating in biomedical research came to light in 1980 alone, with some observers in the lay press calling it a ‘crime wave.’”

Broad, William J. 1981. “Fraud and the Structure of Science.” Science 212, pp. 137–41

1987: “Misrepresentation and Responsibility in Medical Research”

“Early in 1985, after being question about duplicate data in two of his papers, Robert A. Slutsky, M.D., resigned his appointments … at the University of California, San Diego. During the following year, faculty committees investigated Slutsky’s entire bibliography of 137 articles published in seven years; 77 (including reviews) were classified as valid, 48 were judged questionable, and 12 were deemed fraudulent.”

- 77 honest, 60 questionable or fraudulent (~44%)

Engler, Robert L., et al. 1987. “Misrepresentation and Responsibility in Medical Research.” New England Journal of Medicine 317, pp. 1383-1389.

1987: “Fraud in Science”

“[We] must recognize that 99.9999 percent of reports are accurate and truthful, often in rapidly advancing frontiers where data are hard to collect. There is no evidence that the small number of cases that have surfaced require a fundamental change in procedures that have produced so much good science. … Vigilance? Yes. Timidity? No.”

Koshland, Daniel E., Jr. 1987. “Fraud in science.” Science, 235(4785):141.
http://science.sciencemag.org/content/235/4785 (issue home)
http://science.sciencemag.org/content/sci/235/4785/141.full.pdf (article)

1988: “Deception in Scientific Research”

“In recent years, the integrity of a number of scientists and of science itself has been challenged. Evidence that scientific research protocols and result have been falsified makes front page news. … [For] a number of reasons, the current spate of incidents of misconduct in research may be of special significance. Although the evidence is often more sensational than systematic, the incidence of scientific fraud and deception appears to be increasing.”

Woolf, Patricia. 1988. “Deception in Scientific Research.” Jurimetrics Journal 29, pp. 68–95.

1988: “Do Scientists Cheat?”

“NOVA examines the troubling question of scientific fraud: How prevalent is it? Who commits it? And what happens when the perpetrators are caught?”

NOVA. 1988. “Do Scientists Cheat?” October 25.
http://www.pbs.org/wgbh/nova/listseason/15.html (PBS source)
https://www.youtube.com/watch?v=VooaLRqTSPI (YouTube – original broadcast presented in seven parts)

1995: “Sloppy Research Extracts A Greater Toll Than Misconduct”

“A much larger toll is exacted from inadequate experimental design and sloppy execution. The lost effort that is expended in straightening out muddy claims, or merely in plowing through their presentation in the literature, greatly exceeds what can be attributed to intentional fraud.”

Lederberg, Joshua. 1995. “Sloppy research extracts a greater toll than misconduct.” The Scientist. February 20. http://www.the-scientist.com/?articles.view/articleNo/17290/title/Sloppy-Research-Extracts-A-Greater-Toll-Than-Misconduct/

Advice, policies, guidance

Some publications of the National Academies Press

1992 Responsible Science, Volume I: Ensuring the Integrity of the Research Process https://doi.org/10.17226/1864

2002 Integrity in Scientific Research: Creating an Environment That Promotes Responsible Conduct https://doi.org/10.17226/10430

2017 Fostering Integrity in Research https://doi.org/10.17226/21896

Terms

- Scientific fraud – in use in the 1980s
- Misconduct in science – PHS 1989 and NSF 1991
- Questionable research practices – COSEPUP 1992
- Research misconduct – the technical term as of 2000 CE
- Detrimental research practices – Fostering Integrity in Research 2017

PHS 1989

"Misconduct" or "Misconduct in Science" means fabrication, falsification plagiarism, or other practices that seriously deviate from those that are commonly accepted within the scientific community for proposing, conducting, or reporting research. It does not include honest error or honest differences in interpretations or judgments of data.

NSF 1991

"Misconduct" means (1) fabrication, falsification, plagiarism, or other serious deviation from accepted practices in proposing, carrying out, or reporting results from activities funded by NSF; or (2) retaliation of any kind against a person who reported or provided information about suspected or alleged misconduct and who has not acted in bad faith.

Integrity and Misconduct in Research 1995 (a)

Congress-created commission; paraphrased and abridged

1. Research Misconduct
   - Misappropriation (a. plagiarism; b. breach of confidentiality)
   - Interference (take, sequester, or “materially damage any research-related property of another”)
   - Misrepresentation (“a. state or present a material or significant falsehood”; “b. omit a fact so that” a falsehood is made)

Integrity and Misconduct in Research 1995 (b)

2. Other Forms of Professional Misconduct
   a. Obstruction of Investigations of Research Misconduct
   b. Noncompliance with Research Regulations

https://ori.hhs.gov/sites/default/files/report_commission.pdf

Implementation Proposals on Recommendations by the Commission on Research Integrity 1996

- Donna Shalala, the Secretary of Health and Human Services, appointed the Implementation Group on Research Integrity and Misconduct (IGRIM, chaired by William Raub) to evaluate the CRI report.
- IGRIM endorsed 23 of the CRI's 33 recommendations, but not the definition of misconduct, instead suggesting more discussion on the matter (IGRIM 1996:8).

https://ori.hhs.gov/sites/default/files/report_review_group.pdf

Fostering Integrity in Research 2017

> The integrity of knowledge that emerges from research is based on individual and collective adherence to core values of objectivity, honesty, openness, fairness, accountability, and stewardship. When researchers commit research misconduct or engage in other behavior that clearly damages research—what this report terms detrimental research practices—they stray from the norms and appropriate practices of science.

National Academies of Sciences, Engineering, and Medicine. 2017. Fostering Integrity in Research. Washington, DC: The National Academies Press. https://doi.org/10.17226/21896

Federal Policy on Research Misconduct 2005 (a)

§ 93.103 Research misconduct.

Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

(a) Fabrication is making up data or results and recording or reporting them.

(b) Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

Federal Policy on Research Misconduct 2005 (b)

(a) Fabrication is making up data or results and recording or reporting them.

(b) Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

(c) Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

(d) Research misconduct does not include honest error or differences of opinion.

Federal Policy on Research Misconduct 2005 (c)

§ 93.104 Requirements for findings of research misconduct.

A finding of research misconduct made under this part requires that—

(a) There be a significant departure from accepted practices of the relevant research community; and

(b) The misconduct be committed intentionally, knowingly, or recklessly; and

(c) The allegation be proven by a preponderance of the evidence.

http://www.gpo.gov/fdsys/pkg/FR-2005-05-17/html/05-9643.htm (html)

http://www.gpo.gov/fdsys/pkg/FR-2005-05-17/pdf/05-9643.pdf (PDF)

Legal terms (a)

Responsibility

- If the goal and the result are the same, the act is intentional or purposeful
- If the actor knows that the result is virtually certain, the act is knowing
- If the actor is aware that the act carries a large and unjustifiable risk, the action is reckless
- If the actor is unaware that the act carries a large and unjustifiable risk, the action is negligent if the actor should have been aware of the risk
- An intentional/purposeful act is also knowing, and a knowing act is reckless

Note that negligent actions do not fall under the definition of research misconduct.

Legal terms (b)

Standard of evidence

- preponderance of the evidence – more likely than not; 51+%
- clear and convincing evidence – highly probable
- beyond a reasonable doubt – a reasonable person would not have enough doubt to counter the finding

The preponderance of the evidence and clear and convincing evidence are the standards in civil law, in which the punishment is usually monetary. Proof beyond a reasonable doubt is the standard in criminal law, in which the punishment is often imprisonment.

adapted from http://encyclopedia.thefreedictionary.com/culpability

Example of levels of culpability (a)

Examples of levels of culpability

(a) Jack is testing an algorithm for analyzing a complex data set. He creates a made-up data set designed to show that the hypothesis is correct and the data is perfect. He enters the data in his lab notebook but does not label the data set.

(b) Later, a younger researcher working on the project with Jack thinks that the data set is real and it winds up in a publication.

Paragraph (a) describes Jack's actions and his goal. Paragraph (b) describes the result of Jack's actions.

Example of levels of culpability (b)

- If Jack was unaware that his actions posed a large and unjustifiable risk that the data would be mistaken for the real thing and he should have been aware of the risk, his actions are negligent.
- If Jack was aware of the risk, his actions were reckless.
- If Jack knew that the result was virtually certain, his actions were knowing.
- If Jack intended to use his made-up data in a publication, his actions were intentional.
- Intention implies knowingness, knowingness implies recklessness.

Whistleblower (a)

noun One who reveals wrongdoing within an organization to the public or to those in positions of authority: "The Pentagon's most famous whistleblower is ... hoping to get another chance to search for government waste" (Washington Post).

https://www.ahdictionary.com/word/search.html?q=whistleblowers

The American Heritage Dictionary

“How to Blow the Whistle and Still Have a Career Afterwards”

“Filing charges of scientific misconduct can be a risky and dangerous endeavor. This article presents rules of conduct to follow when considering whether to report perceived misconduct, and a set of step-by-step procedures for responsible whistleblowing that describe how to do so once the decision to report misconducts has been made.”

Gunsalus, C. K. 1998. “How to Blow the Whistle and Still Have a Career Afterwards.” Science and Engineering Ethics 4, pp. 51-64. https://doi.org/10.1007/s11948-998-0007-0

“Responding to Research Wrongdoing: A User-Friendly Guide”

“You have come across some unsettling information. A colleague or an assistant or even your supervisor may have purposefully or inadvertently engaged in an act that will result in invalid data or a wrong against others. You may be in the position either to solve a problem, engage in damage control, or refer evidence to the proper office charged with pursuing the matter further. In short, you may be able to promote sound and responsible science.”

Keith-Spiegel, Patricia, Joan Sieber, and Gerald P. Koocher. 2010. “Responding to Research Wrongdoing: A User-Friendly Guide.” http://www.ethicsresearch.com/

Sources (a)

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Sources (b)

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- Free Dictionary, The. “Culpability.” http://encyclopedia.thefreedictionary.com/culpability

*The definition of “research misconduct” begins on page 28,286 in the Federal Register or page 18 on the PDF.

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