

NAS 501 Research Methods and Scientific Ethics

Chapter 6: Scientific Misconduct

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Sharing Scientific Knowledge

“Science is a shared knowledge based on a common understanding of some aspect of the physical or social world”

(NAP, “On Being a Scientist” 1995)

Presentations

- Social conventions play an important role in establishing the reliability of scientific knowledge

Publications in peer reviewed journals

- Research results are privileged until they are published

Thesis

Why Publish?

- **“A paper is an organized description of hypotheses, data and conclusions, intended to instruct the reader. If your research does not generate papers, it might just as well not have been done”**

(G. Whitesides, Adv. Mater., 2004, 16, 1375)

- **“if it wasn't published, it wasn't done”** - in E.H. Miller 1993

Author Responsibilities

– Preparation and Submission of Manuscripts:

Follow General Rules:

- Ensure work is new and original research
- All Authors listed on ms are aware of submission and agree with content and support submission
- Agree that the manuscript can be examined by anonymous reviewers.
- Provide copies of related work submitted or published elsewhere
- Obtain copyright permission if figures/tables need to be reproduced
- Include proper affiliation

What is publishable....

Journals like to publish papers that are going to be widely read and useful to the readers

- Papers that report “**original and significant**” findings that are likely to be of interest to a broad spectrum of its readers
- Papers that are **well organized and well written**, with clear statements regarding how the findings relate to and advance the understanding/development of the subject
- Papers that are **concise and yet complete** in their presentation of the findings

What is not acceptable...

- Papers that are **routine extensions of previous reports** and that do not appreciably advance fundamental understanding or knowledge in the area
- **Incremental / fragmentary reports** of research results
- **Verbose, poorly organized, papers** cluttered with unnecessary or poor quality illustrations
- **Violations of ethical guidelines**, including plagiarism of any type or degree (of others or of oneself)

ethics and integrity

it is vital for leaders of the academic community to ensure that research conducted on our campuses meets the highest standards of ethics and integrity

By integrity of the research process, the panel means the adherence by scientists and their institutions to honest and verifiable methods in proposing, performing, evaluating, and reporting research activities

Integrity in science is perhaps better seen today as an extension of current concerns with quality

Quality refers to the rigor with which experiments are designed and carried out; statistical analyses performed, and results accurately recorded and reported, with credit given where it is due.

Integrity in research means that the reported results are honest and accurate and are in keeping with generally accepted research practices.

Integrity in Research

- Integrity in research is essential for maintaining scientific excellence and for keeping the public's trust.
- Integrity characterizes both individual researchers and the institutions in which they work.
- For a scientist, integrity embodies above all the individual's commitment to intellectual honesty and personal responsibility.
- It is an aspect of moral character and experience.

- Society has a positive attitude toward science and technology and public confidence in consumer products is boosted by claims that they are “scientifically tested” or “scientifically proven.” Such support is qualified, however.
- The public will support science only if it can trust the people and the institutions that conduct research.
- Fostering an environment that promotes integrity in the conduct of research is an important part of that accountability.
- Nevertheless, even the best scientific intentions may produce unverifiable results because of flawed hypotheses, inadequate technology, the faulty execution of research, or the incorrect interpretation of results.
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- In fact, errors, responses to errors, and validation of errors are important elements of the scientific process.

INTEGRITY OF THE INDIVIDUAL SCIENTIST

- Intellectual Honesty in Proposing, Performing and Reporting Research
- Accuracy in Representing Contributions to Research Proposals and Reports
- Fairness in Peer Review
- Collegiality in Scientific Interactions, Including Communications and Sharing of Resources (investigators report research findings to the scientific community in a full, open, and timely)
- Transparency in Conflicts of Interest or Potential Conflicts of Interest
- Protection of Human Subjects in the Conduct of Research
- Humane Care of Animals in the Conduct of Research
- Adherence to the Mutual Responsibilities Between Investigators and Their Research Teams (scientific and interpersonal interactions)

SCIENTIFIC ETHICAL NORMS

Communalism requires that scientific knowledge should be public knowledge.

- The results of research should be published.
- There should be freedom of exchange of scientific information between scientists everywhere.
- Scientist should be responsible to the scientific community for the trustworthiness of their published work.

SCIENTIFIC ETHICAL NORMS

- **Universalism** requires that science be independent of race, color, or creed and that it should be essentially international.

SCIENTIFIC ETHICAL NORMS

- **Disinterestedness** requires that the results of bona fide scientific research should not be manipulated to serve considerations such as personal profit, ideology, or expediency.

In other words they should be honest and objective which does not mean that research should not be competitive.

SCIENTIFIC ETHICAL NORMS

– **Organized skepticism** requires that statements should not be accepted exclusively on the word of authority.

Scientists should be free to question.

The truth of any statement should finally rest on a comparison with observed fact.

Useful Definitions: Scientific Misconduct

“Scientific misconduct 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”

Managing Allegations of Scientific Misconduct: A Guidance Document for Editors, January 2000, Office of Research Integrity, Office of Public Health and Science, U.S. Dept. of Health and Human Services <http://ori.dhhs.gov>

Fabrication

- is making up results and recording or reporting the fabricated results.

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.

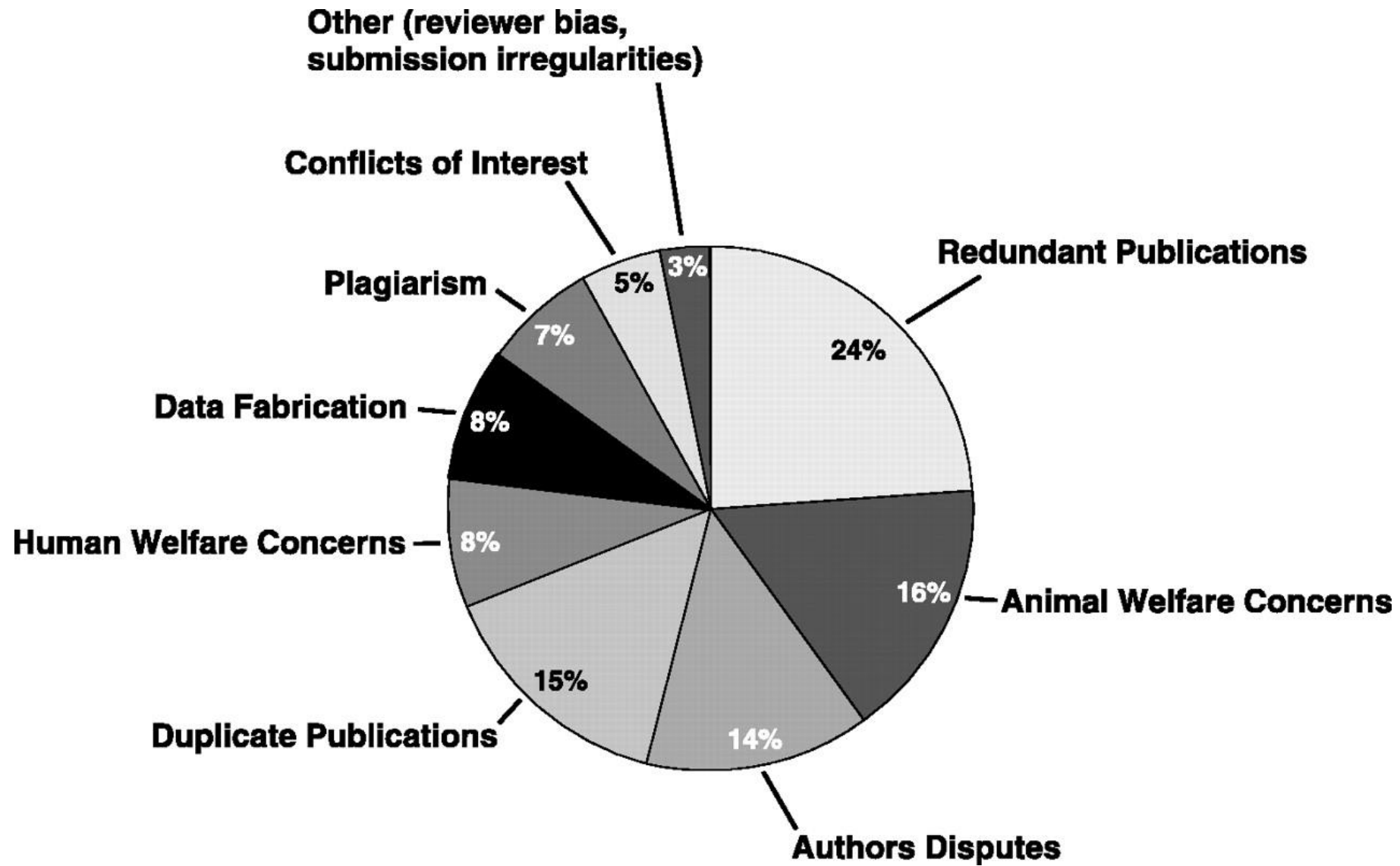
Plagiarism

- is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit and without specific approval, including those obtained through confidential review of others' research proposals and manuscripts.

Table 1. Violations of Scientific Ethics

Types of violations of scientific ethics
1. Falsification, fabrication, deception, fraudulence
2. Plagiarism, the poor disguise, the photocopy, perfect crime
3. Manipulative hidden target
4. Unfair authorship (<i>honor, gift, reciprocal, ghost or paid writer, cheating</i>)
5. Duplicating others' works (<i>duplication, potluck paper, the labor of laziness, resourceful citing</i>)
6. Harmful scientific research
7. Unauthorized use (<i>slipshod research/publication, infringement</i>)
8. Copyright infringement
9. Duplication, salami slicing, self-plagiarism, self-stealing
10. Publication misconduct
11. Non-standard practices (<i>sub-standard, forgotten footnote, misinforming, too-perfect paraphrase</i>)
12. Other violations of scientific ethics

Note: These types of violation have been compiled from the sources cited in the list of references. Because many references have been used for almost every type of violation, it has been deemed not practical to cite every reference each violation is specified.



Distribution of ethical issues in APS publications (1996 through March 2004).

Ethical violations

- Intentional negligence in the acknowledgment of previous work (including work you did)
- Deliberate fabrication of data you have collected
- Deliberate omission of known data that does not agree with the hypothesis
- Passing another researcher's data as one's own
- Publication of results without the consent of all of the researchers
- Failure to acknowledge all of the researchers who performed the work
- Conflict of interest
- Repeated publication of too-similar results or reviews
- Breach of confidentiality
- Misrepresenting others' previous work

Core principles

With respect to what scientists should say, we list and defend five key principles for communicative norms:

- (1) **Honesty**: not lying or intentionally deceiving one's audience, as well as avoiding deliberately misleading incompleteness or manipulation involving deception.
- (2) **Precision**: providing as precise as feasible a description of scientific findings.
- (3) **Audience relevance**: communicating clearly about issues that have implications for public policy in such a way that members of the intended audience can draw valid inferences for policy and policy advocacy.
- (4) **Process transparency**: providing a clear description of the scientific process of inference, and the process of peer review, in such a way that scientifically qualified members of the audience could check the validity of the conclusion for themselves.
- (5) **Specification of uncertainty about conclusions**.

Useful Definitions: Plagiarism and Self-Plagiarism

- **Plagiarism**: using the ideas or words of another person without giving appropriate credit (Nat. Acad. Press document)
- **Self-Plagiarism**: The verbatim copying or reuse of one's own research (IEEE Policy statement)

Both types of plagiarism are considered to be unacceptable practice by most scientific publications

Other Types of Ethical Violations

- Duplicate publication/submission of research findings; failure to inform the editor of related papers that the author has under consideration or “in press”
- Unrevealed conflicts of interest that could affect the interpretation of the findings
- Misrepresentation of research findings - use of selective or fraudulent data to support a hypothesis or claim

Types of plagiarism (no reference)

- The ghost writer
- The potluckpaper (Different sources, like himself)
- The poor disguise (hiding)
- The self-stealer
- The photocopy
- The labor of laziness

“Rather fail with honor than succeed by fraud.”

Sophocles

“Most people say that it is the intellect which makes a great scientist. They are wrong: it is character.”

Albert Einstein

Sooner or later ethical violations get exposed

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