Demystifying the Academic Research Enterprise

Becoming a Successful Scholar in a Complex and Competitive Environment

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9

Honesty Is the Best Policy: Ethical Conduct and Research Integrity

Chapter Overview and Learning Objectives

From promoting moral or social values when collaborating with others to building and maintaining public support and accountability, adhering to ethical standards is a critical element of the research process. This chapter describes responsible conduct of research, how ethics is applied in a research context, and the increasing importance of ethical conduct in research today. Additionally, it provides insight into research misconduct behaviors, their associated consequences, and strategies for creating and maintaining an ethical program of scholarship. After reading this chapter, you should

- Have a strong appreciation for the importance of ethical conduct in research and how upholding values and ethical standards is foundational to the research process;
- Understand the difference between ethics and morality and how to apply ethical principles in research;
- Understand the "big three" types of research misconduct: plagiarism, fabrication, and falsification;
- Be able to identify research misconduct and understand the consequences associated with it;
- Understand the importance of integrity in federal and other government science and how political influence can undermine the use of scientific results;
- Know where to find resources and training materials about responsible conduct of research; and
- Know how to create and maintain an ethical program of scholarship.

9.1   Importance of Responsible Conduct of Research

It is impossible these days to turn on the television or radio, or read a newspaper or online news publication, without learning of the latest scandal or example of bad behavior. Not necessarily a violation of law, but some act that clearly is deemed unacceptable by society: from power and greed in the corporate world that can bring down entire organizations to doping in sports, sexual misconduct in the workplace—even in Congress and the ministry—to covering up indiscretions that might have occurred long ago. Unethical and immoral behaviors seemingly surround us. Perhaps some of us even experienced this firsthand by cheating in school to get that better grade so we could land a scholarship or play on the varsity team. Or maybe we told the truth but with the intent to deceive by withholding some of the facts when confronted by an authority.

We humans obviously have shortcomings, yet humans are at the center of the research enterprise. This begs the question of how morals and ethical behavior figure into that enterprise. Are most researchers honest in how they devise and conduct their experiments? Analyze their data? Present their findings? If research misconduct occurs, what forms does it take, and what motivates people to behave badly? And then what happens if one gets caught? What are the penalties? How high are the stakes? We consider these and other questions in the current chapter, which is among the most important in the entire book. For without responsible and ethical behavior in research, everything else is irrelevant.

Ethical conduct in research, also referred to as responsible conduct of research (RCR) or responsible and ethical conduct of research (RECR), is part of a broader topic known as research compliance. Ultimately, the goal of research compliance, which comprises rules, regulations, laws, and norms involving numerous topics—including ethical norms—is to drive human behavior in certain directions that are deemed essential for ensuring high standards of research practice, personal conduct, and professional accountability. Chapter 10 is devoted to research compliance topics, and in it you will learn about protocols for research involving human and animal subjects, chemical and laboratory safety, conflict of interest, use of controlled substances, clinical trials, research security, the effective handling of restricted or sensitive information, and more.

Before addressing ethics more deeply in the next section, consider first the importance of RECR. Many reasons exist for ethical conduct, but I like how NIH explains it (National Institutes of Health n.d.-a). First, as you know by

now from preceding chapters, research involves a variety of methods and procedures, with notable variations among disciplines (chapter 4). Research also involves perspectives. A physical scientist studying climate change, for example, may have a perspective different from that of a philosopher or historian studying the same topic—and both will use very different approaches for asking and analyzing questions. Disciplines have their own standards for behavior that link to their approaches and goals, which helps scholars to trust one another and the public to trust scholars. Additionally, these standards promote the aims of research, such as developing new knowledge, sticking to the truth in what is uncovered, and avoiding errors. In short, ethical norms play a key role in being able to trust research outcomes.

Second, as we will discuss in chapter 13, research frequently involves collaboration within disciplines and also across them. Ethical standards promote values, and lead to trust, mutual respect, and equitable treatment, all of which are critical elements of working with other people. This especially comes into play when determining how much credit to assign team members as coauthors on a paper, or in an invention disclosure or patent filing. Third—and we touched on this earlier—ethical norms help ensure accountability to those funding the research which, in many cases, is the taxpayer. We address this issue further in chapter 10.

Fourth, ethical norms help build public support for research. If the public knows research is being performed with integrity, taxpayers will have greater comfort in providing funding. (Recall from chapter 3 that public trust in research leaders is second only to that for the military.) Fifth, ethical standards evidenced in research demonstrate more broadly the importance of moral and social values, including human rights, for example. Indeed, as noted at the beginning of this chapter, it is difficult to find examples in society today where ethical standards are uniformly high and conduct is beyond reproach. The research enterprise is without question an important beacon for such behavior, and it does not go unnoticed.

Finally, as noted in section 3.4, the conduct of research itself must be kept free from political or other influence so that results are obtained following accepted practices with the highest integrity. This is true irrespective of the type of organization in which the work is performed, as noted in a report by the National Science and Technology Council (2022b) regarding protecting the integrity of government science—particularly the use of scientific results in policy. Some in the scientific community even have called for the creation of a government-operated research policy board (Gunsalis et al. 2019) to focus on research robustness and quality.

9.2   Ethics and Morality and Applying Ethical Behavior to Research

The words "ethics" and "morality" often are used interchangeably, but in fact are different. Most would agree that ethics is best reflected by the Golden Rule, which states, "Do unto others as you would have them do unto you." You probably heard this as a child. I know I did, though I rarely applied it! In this context, and others such as the physician's Hippocratic Oath, ethics is our road map or set of norms for distinguishing right from wrong—acceptable from unacceptable behavior. Actually, to be precise, ethics is a branch of scholarship involving the study of morality, but we will use the terms interchangeably here. So, what is morality? It is a foundational set of behavioral norms to which we adhere. Who gets to determine what is moral or immoral? For the most part, society does. For example, that murder is immoral and thus unacceptable in most cultures.

We become aware of morals from a variety of influences throughout our life—such as parents, places of worship, school, friends, television, and now social media. And these morals are what shape our values, which are our personal beliefs and application of morals. One of my favorite quotes is "Early in life we shape our values, and thereafter our values shape us." Another one, from Roy E. Disney, is "When your values are clear to you, making decisions becomes easier" (Roy E. Disney Quotes n.d.). I would add that, in my view, morals are what we believe, and ethics is what we do with them—how we act out our moral principles. We will return to this point shortly because, although it may seem as though ethics mostly involve common sense principles, people interpret them differently based upon their own life experiences.

If not apparent already, you soon will discover that bright lines do not always exist between ethical and unethical or marginally ethical conduct in research. Why? Because choices and judgments involving ethics must be made, and interpretations vary about what is acceptable and unacceptable in a given situation. However, one hard truth is that responsible conduct, and following all rules of compliance, is up to *individual* researchers. No excuses can be made for failure to understand rules and ethical norms, or for ignoring them. The consequences of failing in this regard do not fall on our institutions or mentors, but rather they fall squarely on us—the researcher—personally and professionally.

With that preface, it is important to recognize that moral norms are related to, but different than, formal laws. This distinction is important in research because in some situations unethical behavior is not formally illegal. And one could argue the reverse more broadly in society—namely, that some behavior that is formally illegal can in fact be ethical. Immigration is an excellent example. Entering the US without following the proper procedures is formally

illegal. However, for those who entered illegally, say twenty years ago and have been model citizens, some believe it would be immoral or unethical to now deport them.

So, what does the research ethics road map look like? What are the rules? Again, to some extent this depends upon disciplines. However, a foundational moral or ethical code for research does exist, and once again, NIH provides excellent information. First and foremost is *honesty*, which means being truthful in all aspects of research. Never fabricate, falsify, or misrepresent data (more on these topics in the next section), deceive colleagues, research sponsors, or the public, or tell the truth with the intent to deceive. On the heels of honesty comes *integrity*, which means acting with sincerity and consistency. Closely related is *objectivity*, which means avoiding bias (chapter 8) in all aspects of the research process where being objective—which is the hallmark of research—is required.

Be diligent and thoughtful in all you do, keeping excellent records and reviewing results multiple times to ensure their correctness. If you find yourself hurrying to meet a deadline, you may be tempted to skirt the rules or not check facts. Never allow that to happen! As noted in chapter 10, you, as the researcher, have grave responsibility for managing information, money, relationships, and processes that require following strict rules. If you make a practice of doing the right things for the right reasons, and also seek the advice of others if you are uncertain about a particular situation, you will successfully uphold the moral code that underpins the research enterprise.

9.3   Research Misconduct and Associated Consequences

Having examined the concepts of ethics and morality and the role they play in the research enterprise, let us flip the coin and examine circumstances under which ethical breeches occur in research. This is known as research misconduct.

Following adoption of a federal policy on research misconduct in 2000 by OSTP, the Office of Research Integrity (ORI; http://ori.hhs.gov) of the US Department of Health and Human Services (DHHS; http://hhs.gov) defines research misconduct as "fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results" (Office of Research Integrity n.d.-a). I like to refer to fabrication, falsification, and plagiarism the "big three." According to ORI, this policy also sets the legal threshold for proving charges of misconduct. To be considered research misconduct, actions must do the following three things: first, represent a "significant departure from accepted practices"; second, have been "committed intentionally,

or knowingly, or recklessly"; and third, be "proven by a preponderance of evidence." These further stipulations limit the federal government's role in research misconduct to well-documented, serious departures from accepted research practices.

Let us unpack the "big three" terms, again quoting federal government policy. *Fabrication* involves "making up data or results and recording or reporting them." *Falsification* involves "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." Finally, *plagiarism* involves "the appropriation of another person's ideas, processes, results, or words without giving appropriate credit." Note that research misconduct does not include honest error or differences of opinion. It also is important to note these government definitions are adopted by most public and private institutions, including research academic institutions, and were arrived at through discussions with researchers and administrators from those same institutions.

Although fabrication, falsification, and plagiarism are the foundational components of research misconduct, so-called other deviations from accepted practices are important as well and increasingly included in institutional policies. Examples of these other behaviors include publishing the same data or results in more than one publication; inappropriately assigning author credit in publications; withholding details of methodology or results in proposals; using inadequate or inappropriate experiment designs; deleting observations or data points from analyses without rigorous justification; inadequate record-keeping; failing to present data that contradict one's own findings; unauthorized use of someone else's data; changing the design of an experiment in the middle of a study; and failure to report conflicts of interest.

With all of these things in play, you might wonder how frequently research misconduct actually occurs. Although it is impossible to know for certain, studies have shown that outright fraud in the form of the "big three" is relatively rare (e.g., Steneck 2006; Bormann 2013). However, when it comes to some of the "other deviations from accepted practice," the statistics are a bit more concerning (e.g., Kalichman 2020). In various studies involving large populations of researchers, approximately 10 percent of those surveyed indicated they had done things such as dropped data points or failed to present results that contradicted their own prior research.

Because research is a human endeavor, one might believe common sense prevails in making most decisions regarding ethical conduct. However, the path to be taken when confronted with an ethical dilemma sometimes is far from clear. Even well-intentioned people make the wrong call, and often this occurs owing to pressures in research—pressures to publish and garner grants and contracts

in order to secure tenure at an academic institution, pressure to perform in private industry so as to improve the corporate bottom line or get the next product to market, a desire for fame, or because of poor oversight by a superior. This is known as the "imperfect environment" theory of research misconduct because the environment in which one is embedded influences behavior.

The other theory, known as the "bad apple" theory, recognizes that bad actors can be found in virtually any human endeavor. Fortunately, as noted previously, such individuals represent a small fraction of all researchers, though sometimes their actions as so egregious as to garner a great deal of public attention. Unfortunately, this causes certain elements of society, such as members of Congress, to begin painting the research enterprise with a broad brush, believing research misconduct is widespread when in fact it is not. It also leads to unwarranted inherent conflation of certain topics, such as reproducibility of research results (section 4.7) with research misconduct.

The consequences of research misconduct can be severe, ranging from the destruction of one's reputation owing to debarment, which means prohibition from submitting grant proposals or publishing papers, to the most severe penalty of incarceration. In some situations, however, few options exist for punishment of the offender or restitution to those harmed. For example, if an academic researcher conducts experiments in one country and then steals the results and moves to an institution in another country, where the findings are published, the first institution has essentially no legal recourse. One can attempt to convince the journal involved to issue a statement or perhaps retraction, though journals tend to avoid involvement in such disputes unless the published results are demonstrably flawed.

Given the significant time and effort involved in establishing a professional reputation, the horrible outcomes associated with research misconduct tend to be sufficient to keep most researchers on the straight and narrow path of ethical behavior. Indeed, audits, the peer review process, accreditation, program review, software that identifies plagiarized material, and other factors help ensure the research enterprise operates with integrity. Collectively, these and other preventative measures lead many to characterize the research enterprise as "self-policing." Additionally, institutions, and especially academic research institutions, have strict policies for dealing with research misconduct, and they also teach faculty and students how to identify as well as report it. In fact, training in RECR is a requirement for recipients of funding from most federal agencies, which includes faculty, graduate and undergraduate students, and postdoctoral researchers. In the references you will find examples of research misconduct, including some especially famous ones (e.g., Mintz 2012; DuBois et al. 2013; Cantu n.d.).

9.4   Creating and Maintaining an Ethical Program of Scholarship

The most important and effective strategy for creating and maintaining an ethical program of scholarship is to understand the associated issues and requirements, and then obviously, to follow the rules. As noted at the end of the previous section, most academic institutions offer RECR training, and numerous resources are available online as well. If you begin your research career by committing firmly to never stray from the ethical pathway, and to consult those with more experience if you encounter a situation involving an ethical dilemma that is beyond your ability to resolve, you will never regret it.

Both NIH and NSF provide excellent resources for RECR education and training. Quoting from NIH (National Institutes of Health n.d.-e), the goals of such education and training are to:

- Develop, foster, and maintain a culture of integrity in science;

- Discourage and prevent unethical conduct;

- Empower researchers to hold themselves and others accountable to high ethical standards;

- Increase knowledge of, and sensitivity to, ethical issues surrounding the conduct of research by researchers with diverse backgrounds;

- Improve the ability to make responsible choices when faced with ethical dilemmas involving research;

- Provide an appreciation for the range of accepted scientific practices for conducting research;

- Inform scientists and research trainees about the regulations, policies, statutes, and guidelines that govern the conduct of US Public Health Service-funded research and promote compliance with the same; and

- Promote a career-long positive attitude toward research ethics and the responsible conduct of research.

Topics covered include the following, and most or all of these can be found in the numerous programs referenced on federal agency websites (e.g., National Science Foundation n.d.-e). Note that virtually all of these are covered in this book.

- Research misconduct and questionable research practices;

- Data management (i.e., data acquisition, record-keeping, retention, ownership, analysis, interpretation, and sharing);

- Scientific rigor and reproducibility;

- Responsible authorship and publication;

- Peer review;

- Conflicts of interest in research;

- Mentor/mentee responsibilities and relationships;

- Collaborative science;

- Civility issues in research environments, including but not limited to, harassment, bullying, and inappropriate behavior;

- Policies regarding laboratory safety, biosafety, and human and animal research subjects;

- Views about scientists as responsible members of society;

- Social and environmental impacts of research; and

- Contemporary ethical issues in biomedical research.

Although resources exist containing various rules and practices for ethical research encompassing all of the aforementioned topics, with several listed in the references (e.g., Steneck 2006; Kligyte et al. 2007; National Academy of Sciences, National Academy of Engineering, and Institute of Medicine 2009; Bornmann 2013; Shamoo and Resnik 2015), I wish to highlight one topic in particular in the set above that frequently is overlooked, but which is becoming ever more important in the context of responsible authorship and publication: predatory journals.

In general, predatory journals are publications that portray themselves as legitimate, scholarly resources for communicating research and maintaining the historical scholarly record. In reality, just the opposite is true. As noted by Elmore and Weston (2020), predatory journal practices include "falsely claiming to provide peer review, hiding information about article processing charges (APCs), misrepresenting members of the journal's editorial board, and other violations of copyright or scholarly ethics." As a scholar, you must avoid the temptation of publishing in journals that provide a lower bar of entry—which might seem attractive as a means for producing a greater number of publications in a shorter period of time—and instead focus on publishing in highly respected journals that rigorously assess submissions and adhere to the highest standards of integrity. Measures of quality, such as the journal impact factor—which measures the frequency with which articles in a journal have been cited over time and thus indicates the impact of a journal on scholarly work—will assist you in doing so, as will discussions with more senior colleagues.

If you already are conducting research and, by virtue of this book or other means, now realize you have done something unethical or questionable, fear not.

Whatever you do, do *not* continue without addressing the problem. Contact your institutional ethics official or supervisor, discuss the situation, and then work to remedy it. The worst thing you can do is keep it a secret. Secrets are distracting, and previous misconduct, if not addressed, could make you more comfortable breeching ethical standards again. A clear conscience, obtained by exposing your misstep to those capable of assisting you, will make you feel good and be a weight off your shoulders, perhaps setting the stage for additional training to ensure you uphold ethical standards going forward. Additionally, you may be especially effective in training others owing to personal lessons learned.

When you become the leader of a research group or organization, you have an added responsibility of ensuring that everyone in the group is both properly trained in ethical behavior and practices it. You also have, as do all researchers, the responsibility of modeling ethical behavior each and every day. One of the easiest and surest ways to ensure effectiveness is to apply the LAM model, which I have used for many years:

- Learn it—make sure you and others in your charge have completed appropriate training in RECR, whether required or not;
- Apply it—put your RECR training into practice daily to benefit you and your work, but also to model ethical behavior to others; and
- Monitor it—ensure that you, and everyone in your direct charge, are behaving ethically by periodically reviewing your compliance with institutional and other policies. Integrate discussions of RECR into the research process itself and examine scenarios where misconduct might arise. Individuals tend to better internalize concepts such as RECR when discussing and being given the opportunity to explain it to others.

The environments in which research and creative activity are performed are an important factor in setting the proper tone for appropriate conduct. Making sure the environment in your charge is one of high integrity, welcomes questions, and encourages individuals to report possible misconduct, does *not* have a chilling effect on research. Rather, it does just the opposite—it promotes the values and behaviors that are foundational to the conduct of research, and indeed the trust placed by stakeholders in researchers themselves.

Assess Your Comprehension

1. What is the goal of research compliance?
2. List several reasons why responsible and ethical conduct of research (RECR) is so important.

3. What is the difference between ethics and morality?

4. Why do "bright lines" not always exist between ethical and unethical conduct in research?

5. In what ways do moral norms for research differ from formal laws?

6. The moral code for ethical conduct in research consists of a number of principles. List and briefly describe them.

7. What is the formal definition of research misconduct?

8. Compare and contrast the three pillars of research misconduct.

9. What is the "imperfect environment" theory of research misconduct?

10. What is the "bad apple" theory of research misconduct?

11. List some consequences of research misconduct and their potential impacts on one's career as well as the scholarly enterprise more broadly.

12. What mechanisms are in place to help prevent research misconduct?

13. List several actions that you, as a researcher, can take to ensure you are behaving ethically, and that you can take to ensure ethical behavior if you oversee a group of scholars.

Exercises to Deepen Your Understanding

Exercise 1: The US Department and Health and Human Services' (DHHS) Office of Research Integrity makes available a number of case studies for training in responsible and ethical conduct of research (RECR) (https://ori .hhs.gov/rcr-casebook-stories-about-researchers-worth-discussing). Select one case each from two of the categories shown on the website (see the list below) and answer all questions at the end of the exercise:

- Authorship and Publication
- Research Misconduct
- Data Acquisition and Management
- Conflicts of Interest
- Social Responsibility

If you have completed chapter 7, you may wish to select a case from the Peer Review category. If you have completed chapter 13, you may wish to select a case from the Collaboration category.

Exercise 2: Most organizations, public and private, operate with specific "codes of conduct" to which their employees or affiliates must adhere. Often these are cast as institutional values, and in some cases, they are

contained in formal employee contracts. Violation of certain elements may lead to severe penalties, including dismissal or even legal action. For this exercise, use the Internet to identify codes of conduct or formally articulated values for a few organizations in the federal, nonprofit, and for-profit sectors, including educational institutions. Compare and contrast them, and also evaluate the consequences of failure to adhere to the policies. What elements are common to all? How do nonlegal penalties vary among the types of organizations? Provide one example of a recent, high-profile case in which failure to adhere to institutional values or code of conduct resulted in dismissal.

Exercise 3: A number of actual, high-profile research misconduct cases have been reported in the media during the past several decades, and you can find them via an online search for the phrase "research misconduct cases." Search the universe of cases and select one you find particularly interesting. Summarize the circumstances behind the case, identify specific areas of ethical behavior that were violated, and use what you learned from the chapter to determine how such misconduct could have been avoided. For the latter, consider issues such as policies, physical safeguards (e.g., locks, passwords, cameras), and so on.

Exercise 4: Some actions or behaviors can be unethical even if they are not illegal, with the reverse also being true. Identify a specific topic or situation, different from the one provided in the chapter (i.e., on immigration), and explain the ethical and legal dimensions and how they differ from one another. To what extent might laws or policies be changed to address the situation you describe? Do you believe laws and ethical norms are applied equitably, and if not, how could they or their associated processes be modified to do so?

Exercise 5: Suppose you have been selected to lead a team of two hundred researchers in the study of a topic of great national significance. Ethical behavior is of course critical to the project, yet you cannot possibly personally oversee the activities of every individual on the team. Devise an RECR plan for the group. Discuss the various elements of the plan, the way in which you will present the plan to the group to ensure that all elements are clearly understood, and mechanisms for monitoring behavior to ensure compliance by all members of the group.