



Fraud, individuals, and networks: A biopsychosocial model of scientific frauds



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ABSTRACT

The problem of fraud, especially scientific fraud, is global and its identification risk is still in its infancy. Based on an in-depth analysis of several financial and scientific fraud trials, the authors propose a new and integrative model of scientific fraud.

This model identifies two major levels for committing fraud: (i) at the personal skills level (micro-level) and (ii) at the network skills level (macro-level). Interacting continuously with each other, they form a dynamic, efficient, and integrative system: an integrative model of fraud.

The micro-level refers to three factors: (i) personality organization, (ii) social competence, and (iii) the so-called triangle of fraud. The macro-level refers essentially to social network organization and social engineering.

Then, the key to understanding and mostly controlling fraud is to consider both the individual and the environment in which they operate. Based on our model, several steps at the micro- and macro-levels can be proposed.

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1. Introduction

Most known cases of modern-day fraud are in the life sciences and in organizational settings in general [1]. In the biomedical field, as a percentage of the total number of articles published, retractions for suspected fraud have increased 10 fold since 1975 [2]. In a certain way, scientific misconduct can also be considered a white-collar crime, but much more than money and prestige are at stake—the fact is, fraud is “potentially deadly,” and in the area of medicine, researchers are “playing with lives.”

2. Definitions and forms

Scientific misconduct is the violation of the standard codes of scholarly conduct and ethical behavior in professional scientific research. A Lancet review on Handling of Scientific Misconduct in Scandinavian countries provides the following sample definitions (reproduced in The COPE report 1999.) [3]:

- (i) Danish definition: “Intention or gross negligence leading to fabrication of the scientific message or a false credit or emphasis given to a scientist.”

- (ii) Swedish definition: “Intention [al] distortion of the research process by fabrication of data, text, hypothesis, or methods from another researcher’s manuscript form or publication; or distortion of the research process in other ways.”

The consequences of scientific misconduct can be damaging for both perpetrators and any individual who exposes it. In addition, there are public health implications attached to the promotion of medical or other interventions based on dubious research findings [4,5,6].

The U.S. National Science Foundation defines three types of research misconduct: fabrication, falsification, and plagiarism [7].

- Fabrication* is making up results and recording or reporting them. This is sometimes referred to as “drylabbing.” A more minor form of fabrication is where references are included to give arguments the appearance of widespread acceptance, but are actually fake, and/or do not support the argument [8].
- 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 [9].
- Plagiarism* is the appropriation of another person’s ideas, processes, results, or words without giving appropriate credit. One form is the appropriation of the ideas and results of others and publishing as to make it appear the author had performed all the work under which

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the data was obtained. A subset is citation plagiarism—willful or negligent failure to appropriately credit other or prior discoverers, so as to give an improper impression of priority. This is also known as, “citation amnesia,” the “disregard syndrome,” and “bibliographic negligence.” Arguably, this is the most common type of scientific misconduct. Sometimes it is difficult to guess whether authors intentionally ignored a highly relevant cite or lacked knowledge of the prior work. Discovery credit can also be inadvertently reassigned from the original discoverer to a better-known researcher. This is a special case of the Matthew effect [10].

Other types of fraud are as follows:

4. *Plagiarism–fabrication*—the act of taking an unrelated figure from an unrelated publication and reproducing it exactly in a new publication (claiming that it represents new data). Recent papers from the University of Cordoba have come to light showing how this can go undetected and unchallenged for years [6,8,9,10,11].
5. *Self-plagiarism—or multiple publication* of the same content with different titles and/or in different journals is sometimes also considered misconduct; scientific journals explicitly ask authors not to do this. It is referred to as “salami” (i.e., many identical slices) in the jargon of medical journal editors (MJE). According to some MJE, this includes publishing the same article in a different language [10,11].
6. *The violation of ethical standards* regarding human and animal experiments—such as the standard that a human subject of the experiment must give informed consent to the experiment. Failure to obtain ethical approval for clinical studies characterised the case of Joachim Boldt [12].
7. *Ghostwriting*—the phenomenon where someone other than the named author(s) makes a major contribution. Typically, this is done to mask contributions from drug companies. It incorporates plagiarism and has an additional element of financial fraud [13].
8. Research misconduct is not limited to not listing authorship but also includes the conferring authorship on those that have not made substantial contributions to the research. This is done by senior researchers who muscle their way onto the papers of inexperienced junior researchers as well as others that stack authorship in an effort to guarantee publication. This is much harder to prove due to a lack of consistency in defining “authorship” or “substantial contribution” [14,15].

In this work, the authors discuss the process of scientific fraud in general.

3. The architecture of fraud: a common denominator

Tom Bartlett at the *Chronicle of Higher Education*, outlining the techniques of the Dutch psychology professor Diederik Stapel, who has admitted fabricating data, makes scientific fraud sound a lot like Madoff-style financial deception: both include social networking, stonewalling disclosure, and indignation when questioned, and probably share several personality characteristics. There is another parallel: Both Bernard Madoff’s and Diederik Stapel’s numbers were too good. According to the Associated Press report of the case, Stapel’s own graduate students blew the whistle when they found his data “too perfect to be true” [16].

4. A model of fraud

Our model (Fig. 1), based on an in-depth analysis of several financial and scientific fraud trials, identifies two major levels for committing fraud: (i) at the personal skills level (micro-level) and (ii) at the network skills level (macro-level). Interacting continuously with each other, they form a dynamic, efficient, and integrative system: an integrative model of fraud.

The micro-level refers to three factors: (i) personality organization, (ii) social competence, and (iii) the so-called triangle of fraud. The first factor of personality organization more specifically references

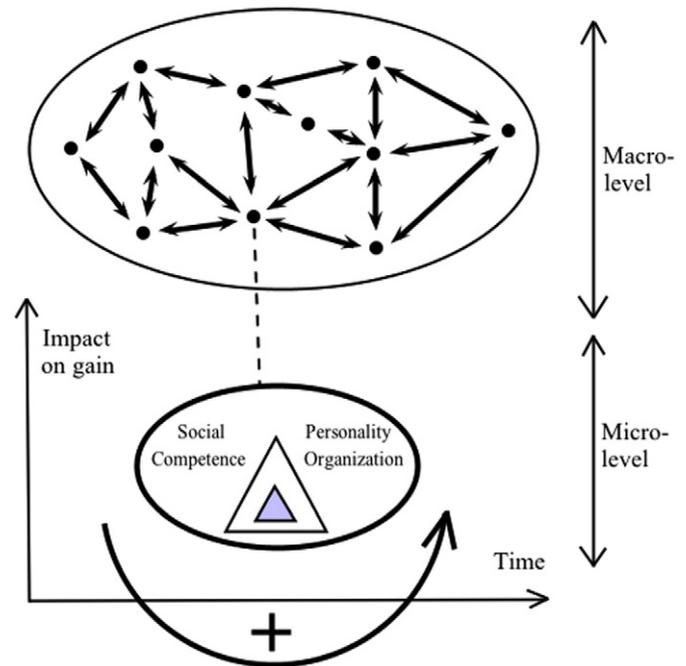


Fig. 1. Integrative model of scientific fraud. This model implies the continuous interactions between micro-level (personal skills and the triangle of fraud) and macro-level (network scale). This model is unidirectional and contagious, and is characterized by positive reinforcement.

personality disorders, social engineering, and the psychopathic syndrome. Roberts and Coid found that narcissistic personality disorder scores among an incarcerated population were associated with fraud and forgery. Looking at the clinical criteria and characteristics of this personality disorder, the narcissistic pattern is probably a common denominator among swindlers [17].

At the extreme, some swindlers might score high enough to be classified as “industrial/organizational psychopaths.” The psychopathic syndrome is characterized by the following traits: (i) amoral and antisocial behavior (not always violent), (ii) inability to form meaningful personal relationships, and (iii) extreme egocentricity and absence of empathy [18,19]. These traits do not preclude success in industry or science; indeed, Dr. Paul Babiak observed at the 2000 Annual Meeting of the American Neuropsychiatric Association that “not all psychopaths end up in prison, and some of them exploit organizational chaos, and thrive in business.” Rather interestingly, in their book, Babiak and Hare refer to industrial psychopaths as “snakes in suits.” [20,21] It seems probable that these industrial psychopaths have their equivalent in the life science area, where “snakes in suits” could be translated into “snakes in lab coats.” Such a personality might be adept at social engineering, which “uses influence and persuasion to deceive people by convincing them that the social engineer is someone he is not, or by manipulation” [22].

Because of this social competence, the second factor at the micro-level, the social engineer can “take advantage of people to obtain information with or without the use of technology.” They cheat and lie their way past those who are naive and/or unaware of the threat, and only through deep familiarity with the methods and techniques they adopt can we put up an adequate defense to pierce the “veil of deception.” The “science of persuasion” is key to understanding how trust violators go about manipulating others. An example is what the convicted felon Sam Antar refers to on his website as “the art of spinning,” involving swindler tactics such as “selling people hope,” “making excuses as long as one can,” or “attacking the messenger to detract scrutiny of one’s own actions” that exploit human gullibility in an extreme fashion [23].

The third and last factor at the micro-level is best characterized as the “Fraud Triangle” (Fig. 2), an idea first coined by Donald R. Cressey.

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