

Reflections on plagiarism and fraud in Brazilian studies

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Abstract

This integrative review reflects on plagiarism and fraud in Brazilian studies based on scientific production and academic attitude. Literature search of articles published between January 2009 and June 2019 was conducted in the DOAJ, LILACS, PubMed, SciELO and Web of Science databases, using the exact descriptors "Plagiarism," "Scientific Misconduct," "Fraud" and "Brazil." The rapid expansion of the internet and technological development lead to increased cases of misconduct in scientific production, occurring, for example, tampering, fabrication or reuse of data, multiple submissions, conflicts of authorship and interests, salami publication (salami slicing) and plagiarism. Among the most common academic misconducts are the copying and plagiarism, present at all education levels, whether in primary or tertiary education.

Keywords: Plagiarism. Fraud. Scientific misconduct. Manuscript.

Resumo

Reflexões sobre o plágio e a fraude em estudos brasileiros

Este estudo reflete sobre o plágio e a fraude na produção científica brasileira por meio de revisão integrativa de artigos publicados entre janeiro de 2009 e junho de 2019. As publicações foram buscadas nas bases DOAJ, Lilacs, PubMed, SciELO e Web of Science, com os descritores exatos "plagiarism", "scientific misconduct", "fraud" e "Brazil". Com a rápida expansão da internet e o desenvolvimento tecnológico, os casos de má conduta na produção científica aumentaram, ocorrendo, por exemplo, adulteração, invenção ou reutilização de dados, múltiplas submissões, conflitos de autoria e de interesses, publicação "salame" (fracionada) e plágio. Entre as más condutas acadêmicas mais comuns estão a "cola" e o plágio, presentes nos mais diversos níveis de ensino, da educação básica à educação superior.

Palavras-chave: Plágio. Fraude. Má conduta científica. Manuscrito.

Resumen

Reflexiones sobre plagio y fraude en estudios brasileños

Este estudio promueve una reflexión sobre el plagio y el fraude en estudios brasileños basados en la producción científica y la postura académica a través de una revisión integradora de artículos publicados entre enero de 2009 y junio de 2019. Se realizó una búsqueda en las bases de datos DOAJ, LILACS, PubMed, SciELO y Web. of Science, utilizando los descriptores exactos "Plagio", "Mala conducta científica", "Fraude" y "Brasil". Con la rápida expansión de Internet y el desarrollo tecnológico, han aumentado los casos de mala conducta en la producción científica, ocurriendo, por ejemplo, adulteración, invención o reutilización de datos, múltiples presentaciones, conflictos de autoría e intereses, publicación "salami" (fraccional) y plagio. Entre las faltas académicas más comunes se encuentran el "pegamento" y el plagio, presentes en los más diversos estratos, ya sea en la Educación Básica o en la Educación Superior.

Palabras clave: Plagio. Fraude. Mala conducta científica. Manuscrito.

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Plagiarism and fraud in Brazilian scientific production have been continuously investigated due to the perceived increased unethical and immoral conduct, which often begins in the authors' school education¹. The incessant quest for publications and the unbridled growth of participation in studies to "improve" the curriculum^{2,3} intensify misconduct and reduce the quality of papers^{2,4}. Such behaviors represent issues for the scientific community, such as the fabrication and tempering of data, plagiarism, and insertion of authors who did not actively participate in the study^{5,6}.

As Nosella⁷ and Silva and collaborators⁸ show, the terms "ethics" and "morality," often used today, differ in their meanings. "Ethics" concerns the *discussion about values, options (freedom), conscience, responsibility, good and evil, good and bad*, whereas morality is linked to *habits, customs, way of living*⁹.

The conduct of researchers who act irregularly, adopting fraudulent behavior to obtain some advantage, must be analyzed in the field of ethics and morality. Considering this, the main goal of this study is to reflect on plagiarism and fraud in Brazilian scientific production by means of an integrative review.

Method

The integrative review method was used to summarize literature results to better understand a given subject (in our case, plagiarism and fraud in Brazilian scientific production), following the five stages proposed by Whitemore and Knaf¹⁰: problem identification, literature search, data evaluation, data analysis, and presentation.

In the first stage, the problem was summarized in a research question: "what do Brazilian studies on scientific production and academic attitude towards plagiarism and fraud show?". Then, the literature search was performed using descriptors from the controlled vocabulary Medical Subject Headings (MeSH) – "plagiarism," "scientific misconduct," "fraud" and "Brazil" – and their equivalents in the Descriptors in Health Sciences (DeCS) – "*plágio*,"

"*má conduta científica*," "*fraude*" and "*Brasil*." Descriptors were combined with boolean operators *and* and *or*: "plagiarism *and* fraud *and* Brazil" or "plagiarism *and* scientific misconduct *and* Brazil."

Search took place on June 14, 2019 in the Latin American and Caribbean Health Sciences Literature (Lilacs), Scientific Electronic Library Online (SciELO), Directory of Open Access Journals (DOAJ), PubMed and Web of Science databases.

Articles published between January 2009 and June 2019, available online in full in Portuguese, Spanish or English, that answered the research question and resulted from studies conducted or published in Brazil were included. Studies that did not meet all these inclusion criteria were excluded.

After analyzing the title, abstract and keywords of the articles found, the pre-selected texts were read in full, and those that answered the research question were included in the final sample of the integrative review.

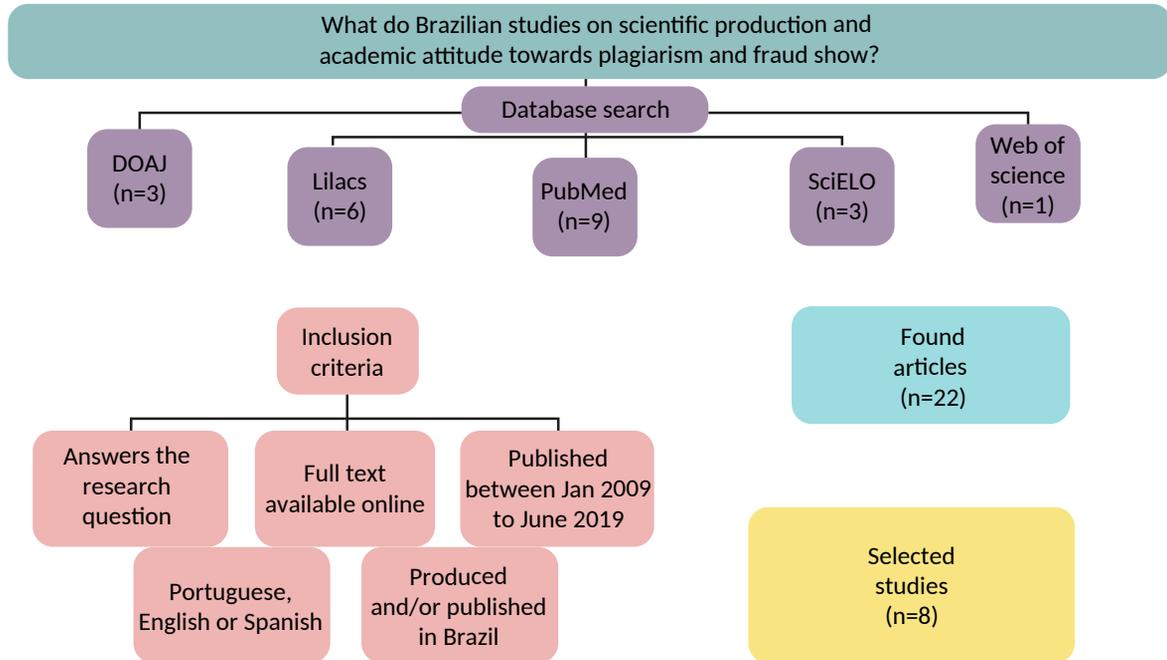
During data evaluation (third stage), a data collection instrument formulated by the researchers was used, with the variables: database, author(s), year of publication, research method, objective and main results. The fourth stage, data analysis, resulted in the following categorizations: sample characterization, evaluation of the articles, scientific production and misconduct of those involved, and academic attitude towards fraud and plagiarism. Finally, the presentation of results (fifth stage) was concluded with this article, which shows the steps, results, and conclusions of the integrative review.

Results

Sample characterization

Database search returned 22 articles: 6 indexed in Lilacs, 3 in SciELO, 3 in DOAJ, 9 in PubMed and 1 in Web of Science. After applying the inclusion and exclusion criteria, reading the titles, abstracts and keywords, 8 articles were selected to be included in the final sample. The Lilacs database had the most studies selected, with three articles, followed by SciELO, with two articles, and DOAJ, PubMed, and Web of Science, with one article each (Figure 1).

Figure 1. Article selection step flowchart



Selection of articles

Of the eight articles included in the integrative review, three were published in 2014 (37.5%) and the other five in 2011, 2015, 2016, 2017 and 2018, one in each year, which allowed a broad time frame. Of these studies,

six were in Portuguese (75%) and two in English (25%). The research method varied, providing a diversity of perspectives. Four studies were literature reviews (50%), two were documentary analyses (25%) and two were cross-sectional studies (25%) (Table 1).

Table 1. Distribution of articles according to the selected variables, in chronological order of publication

Database	Author(s) and year of publication	Research method	Objective	Main results
SciELO	Sauthier, Almeida Filho, Matheus, Fonseca; 2011 ¹	Documentary analysis	To characterize fraud and plagiarism in scientific research and analyze the repercussions of this phenomenon.	Fraud and plagiarism occur due to competitiveness and the possibilities of electronic documentation. To combat these practices, recognizing the need for moral improvement of society is necessary.
Web of Science	Lins, Carvalho; 2014 ²	Literature review	To focus on scientific integrity and identify predisposing factors of scientific misconduct in Brazil.	Brazilian scientific production increased, but the quality of publications decreased.
SciELO	Veludo-de-Oliveira, Aguiar, Queiroz, Barrichello; 2014 ¹¹	Cross-sectional	To analyze the behavior of business students regarding dishonest academic practices, such as copying and plagiarism.	More than 70% of students have been involved in fraudulent situations, and more than 90% believe that other students have already participated in fraud. Undergraduate students tend to minimize the severity of fraudulent acts.

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Table 1. Continuation

Database	Author(s) and year of publication	Research method	Objective	Main results
Lilacs	Silva, Mello, Pieri, Évora, Melo; 2014 ¹²	Literature review	To identify anti-plagiarism software used as a tool to combat fraud.	Of the publications analyzed, 83% refer to anti-plagiarism tools for academic manuscripts, 12% to program code detectors, and 5% to website plagiarism detectors.
Lilacs	Padua, Guilhem; 2015 ¹³	Literature review	To outline an overview on the topic of scientific integrity in Brazil by analyzing studies published in scientific journals.	The discussion on scientific integrity in Brazil is still scarce.
DOAJ	Sousa, Conti, Salles, Mussel; 2016 ⁵	Literature review	To present arguments that show the damage of academic dishonesty to society, considering its reflection on the ethical formation of professionals, who end up tolerating dishonest practices.	The most common types of dishonesty are: copying, plagiarize, tamper with or fabricate data, submit the same study to several journals, cheat, forge group participation, work in a group with segmented performance and gain advantage through unauthorized computational access.
PubMed	Santos, Santos, Sant'ana, Masuda, Barboza, Vasconcelos; 2017 ⁴	Cross-sectional	To analyze the perception of 42 high school science teachers from one of the most prestigious federal schools in Brazil about plagiarism and related pedagogical issues.	About 50% of respondents admit that students commit plagiarism in tasks.
Lilacs	Silva, Vera, Elias, Lucchese, Fernandes, Lucas; 2018 ⁸	Documentary analysis	To analyze legal provisions that guide scientific research in Brazil regarding ethics and integrity.	The analysis produced a framework with conduct guidelines and generating organizations.

Discussion

Scientific production and misconduct of those involved

The rapid expansion of the Internet and technological development lead to increased cases of misconduct in Brazilian scientific production, as indicated by most studies found^{1,4,5,8,12}. But just as the Internet facilitates inadequate behavior, software and mechanisms have been created to detect and prevent such conducts¹². These tools, however, are insufficient without awareness-raising efforts by institutions, editors and researchers.

Brazil accounts for more than two-thirds of the scientific production in Latin America, which corresponds to 4% of the world production¹⁴, and according to data from the Global Research Report, the country went from 8,000 publications in 1998 to 17,500 in 2007¹⁵. The quality of publications, however, has decreased².

Tampering, fabrication or reuse of data, multiple submissions, conflicts of interest, “salami” publication (salami slicing) and plagiarism (the latter discussed by all the articles found in this study) are the most common examples of scientific misconduct or fraud, defined below.

- Tampering, fabrication or reuse of data: concerns the falsification or use of previously published data as if it were new^{1,5}.
- Multiple submissions: the act of making minor changes to a previously published paper to submit it to other platforms⁵. Lins and Carvalho² revealed this type of fraud in a Brazilian article submitted to an Elsevier publication. The paper contained data previously published in the journal *Memórias do Instituto Oswaldo Cruz* (Memories of Institute Oswaldo Cruz) and in the *Journal of Applied Entomology*.
- Conflict of interest: situation where there are conflicts between public and private interests that compromise the whole. This occurs, for example, in studies where authors and institutions have different goals, and not all authors are really involved, or when companies finance biased studies and present results of their interest^{8,13}.
- “Salami” publication (salami slicing): happens when parts of a paper are published separately, thus suggesting that each text results from independent research¹³.
- Plagiarism: using others’ ideas, words and works without giving due credit, appropriating others’ work of others as one’s own^{1,2,4,5,8,11-13}. “Self-plagiarism”, defined as copying, in whole or in part, productions already published by their own authors is also an issue¹. In Brazil, plagiarism violates Law 9,610/1998¹⁶, which addresses copyright, and is considered a crime under article 184 of the Penal Code¹⁷, punishable by detention from three months to a year or a fine.

Currently, the copying of personal data through digital means is also a concern, especially when used without the holder’s consent. Law 13,709/2018¹⁸, known as *Lei Geral de Proteção de Dados Pessoais* (Brazilian General Data Protection Law), provides for the processing of such data by natural person or legal entity under public or private law, to protect the fundamental rights to freedom and privacy.

One of the most discussed cases on research ethics in recent years took place at the International Summit on Human Genome Editing, which denounced Chinese geneticist He Jiankui for reporting that he altered genes in twin embryos to make them resistant to the human immunodeficiency virus¹⁹.

In Brazil, some events – such as the *Encontro Brasileiro de Integridade da Pesquisa e Ética na Ciência e Publicação* (Brazilian Meeting on Research Integrity and Ethics in Science and Publication), held since 2010 and with the next edition scheduled for 2021 – aim to bring together the scientific community to discuss research ethics²⁰. Tertiary education must address issues related to ethical conduct and scientific integrity, especially plagiarism^{4,5,8,11,12}, not only in a specific discipline, but in the courses as a whole^{4,8,10,11}.

Academic attitude towards fraud and plagiarism

The articles analyzed here point out that the prevention of plagiarism and fraud must start in the formative period, regardless of the area of activity, since the behaviors adopted in this period will reflect on the professional practice^{5,11}. Santos and collaborators⁴ further argue that such misconducts begin in basic education, as a result of the pressure for productivity and results, to the detriment of the quality of teaching. This context favors recurring practices that can lead to worrying transgressions.

High school students, for example, use internet resources to commit plagiarism in many tasks, which hinders the development of critical sense. Rethinking pedagogical acts is thus crucial, since the content itself is easily found on the web and often the very wording of the assignments encourages plagiarism⁴.

Discussing tertiary education, Veludo-de-Oliveira and collaborators¹¹ analyzed the behavior of undergraduate and graduate business students by applying a questionnaire that addressed situations such as copying and plagiarism. The authors found that more than 70% of the interviewed students had already been involved in fraudulent situations, and that the intent to commit any of these acts is greater when friends are involved.

In the health field, Sousa and collaborators⁵ list as the most common types of academic dishonesty: copying, that is, actively using unauthorized materials to do academic exercises, or passively, by facilitating the action of colleagues who wish to copy; including or have one’s name included in assignments without due participation to get a grade; segment group work by assigning individual tasks that should be known to all participants; and

plagiarize by copying other's materials, in whole or in part. Some students also pay for others to partially or completely write their term paper or adjust statistical data¹.

Observing such behaviors leads to questions about their motives: lack of preparation, of supervision and punishment, or simply ignorance? The fact is that these attitudes, regardless of the area of activity, will reflect on the student's performance as a professional and researcher, affecting the quality of scientific production and the very notion of ethics in Brazilian society.

Final considerations

Despite the scarcity of research addressing plagiarism and fraud in Brazilian studies, an increase in cases of misconduct in scientific production has been observed, mainly represented

by tempering, fabrication or reuse of data; multiple submissions; conflicts of authorship and interests; salami publication (salami slicing); and plagiarism. Copying and plagiarism are among the most common academic misconducts, present in all education levels, from basic to higher education.

Ethics and good conduct must be addressed throughout the training of future professionals, not just in tertiary education and in a single discipline. If the goal is to prevent fraudulent acts, investing in quality education from the base, which will benefit the entire population, is necessary.

Changing the behavior of students, educators and legislators is essential to combat fraudulent attitudes. Finally, this study suggests that further research be conducted for a more in-depth understanding of the issue and the proposal of actions to encourage good conduct, especially in the academic environment.

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Gildiney Penaves de Alencar delimited the topic, defined the inclusion criteria of the integrative review, wrote the article and, together with Geanlucas Mendes Monteiro, searched the databases and analyzed the results. Alexandra Maria Almeida Carvalho supervised the manuscript writing and drafted the final considerations.

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