International Journal of Information Science and Management
Vol. 23, No. 3, 2025, 131-153
DOI: https://doi.org/10.22034/ijism.2025.2030441.1502 / DOR: https://dor.isc.ac/dor/20.1001.1.20088302.2025.23.3.8.6

Original Research

Analysis of the Dimensions and Indicators of Scientific Populism: Developing a New Concept Based on a Qualitative Study

Oranus Tajedini
Associate Prof., Department of Knowledge and Information Science, Shahid Bahonar University of Kerman, Kerman, Iran.
tajedini@uk.ac.ir
ORCID iD: https://orcid.org/0000-0003-1963-2115

Ali Sadatmoosavi
Associate Prof., Department of Medical Library and Information Sciences, Faculty of Management and Medical Information Sciences, Kerman University of Medical Sciences, Kerman, Corresponding Author:
a.moosavi@kmu.ac.ir / moosavi56@gmail.com
ORCID iD: https://orcid.org/0000-0001-6800-3345

Raziye Valinejad
M.A. in Knowledge and Information Science, Shahid Bahonar University of Kerman, Kerman, Iran.
r.valinezhad60@gmail.com
ORCID iD: https://orcid.org/0009-0003-8368-5622

Ali Akbar Khasseh
Associate Prof., Department of Knowledge and Information Science, Payame Noor University, Tehran, Iran.
khasseh@pnu.ac.ir
ORCID iD: https://orcid.org/0000-0001-5664-4671

Mahdiyeh Khazaneha
Assistant Prof., Neurology Research Center, Kerman University of Medical Sciences, Kerman, Iran.
m.khazaneha@kmu.ac.ir / khazaneha.m@gmail.com
ORCID iD: https://orcid.org/0000-0002-3800-466X

Ali Shabani
Assistant Prof., Faculty of Management, University of Tehran, Tehran, Iran.
alishabani.sh@ut.ac.ir / alishabani.sh@gmail.com
ORCID ID: https://orcid.org/0000-0001-7323-4332

Received: 29 May 2024
Reviewed: 09 July 2024
Accepted: 21 October 2024

Abstract

Throughout the evolution of scientific research, various types of populism have been identified. One of the critical terms in the scientific research lexicon is scientific populism, which refers to instances that extend beyond the usual plagiarism. Scientific populism is often associated with scientific immorality and deceptive practices in scientific environments. Given the prevalence of research fraud and immoralities in academic settings, this study aims to introduce and explain the dimensions and characteristics of scientific populism as a new concept. This study employed a qualitative method and was grounded in theory. The research population included the top Iranian researchers listed in the Essential Science Indicators. Participants were selected through sequential snowball sampling, and the data were collected through in-depth interviews. Findings were presented based on the participants' perception, understanding, and interpretation, causal conditions, intervening conditions, strategies, and the consequences of scientific populism. To this end, the data were divided into codes and themes. The resulting themes were then used to extract related categories and subcategories associated with the phenomenon. Results showed that the process of scientific populism can be

understood based on logical principles, because the anomalies in the scientific and academic settings originate from factors such as disbelief in the system of creation, diminution of the principles of research ethics, lack of an intelligent system for detecting violations in scientific productions, dominance of personal interest over regulations and rules, inefficient employment regulations, poor review and assessment protocols in some journals, and resort to scientific immorality to gain promotion.

Keywords: Populism, Scientific Populism, Plagiarism, Scientific Deception, Research Misconduct.

Introduction

In recent years, scientific research has played a significant role in evaluating the work of researchers and organizations. Some of the most critical aspects of scientific research include scientific content, qualitative value, adherence to scientific integrity, and adherence to research ethics. Ethical considerations play a crucial role in the field of scientific research, and the Ethics component is considered one of the primary components and indicators of the scholarly publication system (Hamrahi, Pournaghi, & Matlabi, 2023). When it comes to scientific research, it is the researcher who paves the way for attaining the ultimate goal and discovering the truth (Conniff, Roberts, Basurto, Drake, & Ellner, 2012). However, concerns regarding research quality are raised, and researchers may engage in scientific misconduct for any reason (Heuritsch, 2023). With an overwhelming amount of scientific output, research misconduct has garnered growing attention worldwide (Han et al., 2023; Pan, 2020), and retraction rates have increased since the beginning of the 21st century (Choudhry, Anur, Choudhry, Kokush, Patel, & Fang, 2024). It is essential to acknowledge that the prevalence of research misconduct should not be underestimated, and all stakeholders in the scientific community have worked toward curbing errant or fraudulent practices (de Vrieze, 2021; Tang, 2023).

Scientific misconduct involves convincing others to believe in the reality of something that is not true (Tijdink, Verbeke, & Smulders, 2014). According to Hamner and Robison (1992), scientific misconduct falls into two main categories: (a) Unintentional scientific deception, covering all kinds of unintentional mistakes caused by carelessness and ignorance, and (b) Intentional scientific deception that refers to mistakes made intentionally, including scientific deception, manipulation, and plagiarism. Deception occurs when the researcher, after conducting various experiments, reports only the cases he/she consider to match relevant standards. Manipulation refers to the practice of a scientist obtaining various data but only reporting data that is consistent with their theory or purpose. Scientific forgery refers to the practice of a scientist publishing completely fabricated results to gain scientific credibility and reputation (Ellen, Day, & Davies, 2018).

Plagiarism, described by various terms such as scientific robbery, scientific theft, idea theft, word theft, and content theft, is not limited to articles or books. Still, it covers any reckless use of texts, images, ideas, or registered and unregistered plans or projects by someone who is not the original creator (Erman, 2018). On the other hand, the application of the word "use" in this definition is correct. Still, it should be borne in mind that it does not merely refer to direct copying, but also includes citations, translations, summaries, suggestions, interpretations, and so on, and it approaches thought transference. Thought transference refers to the author's indirect influence from works he/she has read from the past up to now (Marsh & Landau, 1995).

Sometimes, people do not consider this type of use to be a case of plagiarism, and they may struggle to write unwanted scientific texts (Vehviläinen, Löfström, & Nevgi, 2018). In the most optimistic scenario, and if unintentional, it is considered a kind of scientific laxity. Since plagiarism may occur in all scientific and research fields, plagiarism and its instances are known as forms of deception in the scientific environment that are part of immoralities related to research and scholarly works that appear to deceive members of the scientific community with a justified appearance and are indicative of populism in the scientific environment (Wills, 2015). In populist movements, an explicit or implicit coalition is usually established between different classes with varying and sometimes conflicting interests. Populism deals with the masses and is, in fact, a mass movement. Still, due to a lack of coherent organization and a lack of definite and real purpose, these movements are more cohesive and have regular, orderly arrangements that continue to serve their interests and intentions (Hawkins, Carlin, Littvay, & Kaltwasser, 2018).

Throughout the evolution of scientific research, various types of populism have been discussed in numerous texts, including economic populism, social populism, political populism, religious populism, cultural populism, virtual populism, and scientific populism (Featherstone, 2015). Populism is an indecent behavior that, if it penetrates academic environments, goes beyond scientific deception to the extent that some of the educational elite exploit this indecent behavior and use it to gain scientific and scientific reputation and for demagoguery. This behavior diverts knowledge production away from the fundamental importance of science, causing science to lag in the scientific environment (Babaii & Nejadghanbar, 2017).

One of the most critical terms in the scientific research lexicon is scientific populism, which refers to cases beyond the usual plagiarism. In scientific populism, the development of science, which initially focused on producing pure knowledge, shifts to meeting needs such as academic reputation, securing significant funding, achieving social status, and engaging in scientific demagoguery (Sade, Canver, D'Amico, Ellis, Fenton, Freeman, & Ohman, 2016). Nowadays, scientific populism has become a sensitive and pervasive phenomenon in scientific research, potentially overshadowing the pillars of scientific communities. Scientific populism is often associated with scientific immorality and deceptive practices within the scientific community.

The health of research is accepted by society when it leads to scientific progress, and universities can play an essential role in this regard. Although scientific research can play a crucial role in intellectual, research, social, economic, and other activities (Brownson, 2017), what is considered a threat is scientific misconduct or immorality that undermines adherence to ethical and scientific standards in research work. To prevent scientific deception, to promote science and the needs of the scientific community, this study aims to use the opinions of top Iranian researchers listed in the Essential Science Indicators (ESI) to identify and explain the dimensions and indicators of scientific populism and to take a step towards identifying, denouncing and restricting this phenomenon.

The concept of populism has been studied in various domains, including energy and household welfare (Hancevic, Cont, & Navajas, 2016), oil (Matsen, Natvik, & Torvik, 2016), the geography of democracy (Wills, 2015), liberal democracy (Bugaric, 2008), and other fields. Moreover, there is another concept called "science-related populism," which differs from "scientific populism" and has recently garnered the attention of researchers. Science-related populism is rooted in populism and skepticism towards science, scientific actors, and scientific

findings (Kohler & Koinig, 2023). Science-related populism generally refers to the idea that virtuous "ordinary people" reject knowledge produced by "academic elites" because it is allegedly useless and ideologically biased, and instead demand that their common sense and will should determine decisions about scientists' research agendas, funding, and, ultimately, the "production of truth". It has been conceptualized as a set of ideas suggesting a fundamental conflict between an allegedly virtuous people and an allegedly immoral academic elite over who should be in charge of science-related decision-making and over what is deemed "true knowledge" (Mede & Schäfer, 2020; Mede & Schäfer, 2022; Mede, Schäfer, Metag & Klinger, 2022). Conceptually, science-related populism consists of four major components: (a) the ordinary people, (b) the academic elite, (c) science-related decision-making sovereignty, and (d) truth-speaking sovereignty (Mede, Schäfer & Füchslin, 2021).

While previous research has touched on related themes, to the best of our knowledge, no study has systematically analyzed and identified the characteristics and dimensions of scientific populism. Therefore, this study examines the concept of populism by focusing on its scientific context and activities. Any scientific research should include data, a transparent methodology, and principles such as honesty and integrity in the provision and management of data. Researchers often fail to adhere to ethical and scientific standards in their research, resorting to scientific misconduct and misbehaviors that have been increasing in scientific research (Batane, 2010). Therefore, identifying such behaviors is very important for academic officials, decision-makers, researchers, students and even other people in the community (Park, 2003). Also, in the wake of the increasing attention being paid to the rise of scientific ranks around the world, lies, theft, and immoral practices are equally denounced throughout the scientific community. This being so, this study seeks to answer the following research questions:

RQ1. What are the conditions for scientific populism?
RQ2. What are the contextual conditions of scientific populism?
RQ3. What are the interventionist strategies and conditions in scientific populism?
RQ4. What are the consequences of scientific populism?

Materials and Methods

Qualitative research is a type of research whose findings are obtained through statistical methods or quantification tools (Strauss & Corbin, 1998). The primary feature of qualitative research is its focus on specific situations or individuals and its emphasis on words rather than numbers (Maxwell, 1996). Grounded theory is a research strategy that enables researchers to derive theories, hypotheses, and theorems directly from the data, rather than deducing them from prior assumptions, other research, or theoretical frameworks. In this approach, data collection, analysis, and theories are closely linked, ultimately derived from the data. Instead of starting with pre-conceived theory, the researcher begins with a specific field of study and allows the theory to emerge from the data (Strauss & Corbin, 1990). Given its objectives, the present study employed a qualitative method based on grounded theory (Charmaz & Belgrave, 2007).

The research population included the top Iranian researchers listed in the Essential Science Indicators (ESI) database of Clarivate Analytics Institute. Given the methodology used in this study and the extensive nature of the research populations, a sampling technique should be employed to select members of the research sample. The selection of participants in qualitative

research depends on the research purpose (Glaser & Strauss, 2017). After reviewing various sampling methods in qualitative research, snowball sampling was employed in this study to select participants from Iranian researchers listed in the Essential Science Indicators. First, the chancellor of Shahid Bahonar University of Kerman, as one of the ESI-listed scientists, was interviewed. It is worth noting that the interviews were conducted both in person and electronically. After interviewing 17 faculty members of Shahid Bahonar University of Kerman, the researcher determined that the data had reached theoretical saturation and thus concluded the interview process.

The data were collected through in-depth interviews, a standard method of data collection in qualitative research. In-depth interviews are based on the belief that individuals are the most competent authorities in expressing their experiences of events and phenomena. If different people are interviewed about an event or phenomenon, diverse views will be collected regarding the event or phenomenon in question. To determine the validity and reliability of the present study, Lincoln and Guba's (1985) evaluation method was employed. To this end, three criteria—credibility, transferability, and dependability — were used to parallel the conventional quantitative assessment criteria of validity and reliability.

To analyze the collected data and develop the theory, theoretical coding was employed. Theoretical coding is an inductive and heuristic method that enables the development of a theory or model by analyzing text into precise elements and concepts (Mills, Bonner, & Francis, 2006). The data were coded in three stages: open, axial, and selective coding, utilizing continuous comparisons grounded in grounded theory (Strauss & Corbin, 1998). To this end, the data were first transcribed and saved. Then, they were exposed to open coding, and appropriate codes were assigned to different parts of the data, and these codes were classified into rational categories. Axial coding was performed in the next stage, followed by selecting coding, whereby the main categories were selected and related to other categories.

Results

This section presents the results of the data analysis. Data analysis is a process by which the collected data are summarized, coded, categorized, and processed. Qualitative data describe reality using words. With this data, one can hypothesize about the relationships between variables and their underlying structure, and ultimately present a theory. The analysis of qualitative data is done in three stages: (1) Data summarization, (2) data presentation, and (3) conclusion. Data summarization means selecting, concentrating, arranging, and converting data into a compact form. Data presentation is the process of organizing a set of data to facilitate informed conclusions. To draw conclusions or confirm the results of the qualitative data, the researcher must discover the meaning of each event, arrange the events, detect their pattern of occurrence, explain how they are likely to occur, identify the factors involved, and finally develop and present related propositions or theorems.

Conceptualization

The most crucial step when analyzing data collected from interviews is to identify the categories of indicators and events, thereby understanding the events and their underlying causes. The researcher then labels the identified categories and relates them to each other. This process is called theoretical coding. Coding is an operation by which data is collected, broken

down, and conceptualized. Afterward, the decomposed pieces of data are reconnected in new ways. The theory is derived from data analysis through theoretical coding, which involves three stages: open coding, axial coding, and selective coding. Coding refers to the classification of data segments with a short label that can represent the data segments despite their brevity.

In coding qualitative research, the researcher categorizes concepts under more abstract concepts. As the number of concepts increases, the researcher should begin to organize them and place each category under more abstract concepts or subcategories. This process of linking the categories to the subcategories is called axial coding. Then the causal conditions, grounds, intermediate conditions, strategies, and consequences are determined. The last stage is selective coding, in which the theory goes through the process of integrating and refining. In integration, categories are organized around a central concept that has explanatory power. Once we adhere to a central idea, the main concepts are linked together by explanatory sentences that suggest a connection. This process helps build a theory, improves it, and increase its internal validity. Figure 1 illustrates the conceptualization of the interview sentences.

Interview Code	Interview Date	Start and end time
A	July 17, 2019	10:30 am to 11:10 am

Interview transcript	Emerging themes
Scientific populism is a crisis that is influenced by various factors and ultimately affects the national and international scientific structure.	The negative impact of populism on the national scientific structure
Since the time production was considered as a commercial and economic activity, science made progress under the influence of commercial and economic aspects, and this business aspect, on one hand, and the lack of proper supervisory regulations, on the other hand, have led to some anomalies and immortalities in conducting scientific research. Such anomalies caused the nature of science and knowledge production and spiritual use of knowledge to be affected by economic and material factors leading to the emergence of a commercial domain called commercialized science and paving the way for opportunistic people to commit violations in the field of knowledge production.	Economic and commercial aspects of the intervening factor The lack of proper supervisory regulations as a reason for immoralities and anomalies Commercialization of science leads to violations

Figure 1: Conceptualization in open coding

Category detection

To detect categories and their characteristics, sentences containing the concept in question, along with the interviewee's identification code and the identified concepts, were recorded in a table, and then the concepts were categorized. An example of categorization is shown in Table 1.

Table 1
Conceptualization and categorization from the interview transcripts

Sample sentences	Conceptualization	Categorization
In scientific fraud and misconduct, individuals act unethically to promote their social status or to promote their scientific status through nepotism, abuse of their occupational position, and the payment of money to others to write articles. Such individuals gain a position through deception and opportunism, lacking the necessary competence and qualifications.	Some people seek reputation and fortune through nepotism, utilizing job opportunities, paying bribes, and engaging in the buying and selling of influence.	Favoritism and nepotism instead of meritocracy, abuse of one's position and power, and the acquisition of wealth and reputation by buying and selling scholarly works.
Cultural anomalies and the increasing prevalence of opportunism in society, along with the rise of means-end thinking, have justified the achievement of goals, even if achieved illegally. When so many people in the community have succeeded in this manner and no decisive action has been taken against them, others are encouraged to follow suit.	Societal anomalies and cultural problems, and the lack of statutory laws to deal with abusive individuals, lead to scientific misconduct and abuse.	Cultural anomaly and lack of effective laws and regulations
Some institutes and groups receive funding and write articles and theses for others, which are then published in their names. This does not represent the scientific integrity of the person publishing the paper with the money, as it fraudulently causes significant harm to the production of knowledge, and the deceiving person may be promoted to a position they do not deserve.	Writing and publishing articles for others by some people or groups in exchange for money, a position, or special privileges Scientific misconduct to gain reputation and promotion, or to be appointed to a position.	Material motivations and wealth acquisition by scientific misconduct Gaining reputation and position by fraud and misconduct

As can be seen in the table above, after extracting the intended sentences from the interview transcriptions and placing them in the table, first, the related themes are conceptualized, and the category fitting each concept is extracted.

Data coding

Open coding

At this stage, the data are categorized into classes related to the phenomenon under study. The researcher identifies key categories and subcategories using data collected from interviews, observations, daily notes, and technical notes from field operations (Thomas, 2006). Table 2 presents the open coding of a sample of the interview transcripts with the participants.

Table 2
Open coding of the interviews with the participants

User code	Interview transcript	Open coding
A2 A13	Scientific populism is rooted in the individual's beliefs. Disbelief in the world of creation and the notion that this world is a rule-governed system leads individuals to engage in various forms of immorality and misconduct, and they plan their illegal actions accordingly. A crucial factor is the nature of humanity and its sensual desires. Sensual desires, extravagance, and self-interest lead to misbehavior, and the more these tendencies are reinforced, the more motivated people are to pursue them. However, a person who is appointed to a position or receives a promotion through scientific misconduct, fraud, or others' support will likely feel guilty and ashamed, and will not have peace of mind. Therefore, the illegitimate use of a scientific production makes the person possess it, but the feeling of internal dissatisfaction results in tension and discomfort.	Disbelief in the principle of the system of creation and that the universe is a rule-governed system leads one to a variety of immoralities. Sensual desires, self-motivation, extravagance, and self-interest can lead to misconduct. A person who is appointed to a position or gets a promotion through scientific misconduct, fraud, and others' support,/will have the feeling of guilt and shame, and the feeling of internal dissatisfaction results in tension and discomfort.
A3	The lack of effective laws and regulations to address those who engage in scientific misconduct, the mismatch between the crime and the imposed penalty, and the absence of proper regulations, as well as the failure to join the Copyright Act, allow self-interested individuals to commit misbehavior. Therefore, the lack of effective rules and the absence of a penal code that adequately addresses the crimes committed by individuals can render it impossible to take preventive measures and control such violations. One consequence of scientific populism is that when people create or receive scientific work through fraud and cheating, it does not lead to scientific growth in themselves or society, and it does not add to the body of knowledge. Because if they spend time thinking, they might come up with new realities in their field of expertise and could contribute to the development of human knowledge. When people claim to be the creators of scientific work but are not its actual owners,	The lack of effective laws and regulations to deal with those who engage in scientific misconduct, the mismatch between the crime and the imposed penalty, and the lack of proper rules and not joining the Copyright Act and the absence of a penal code fitting the crimes committed by people cannot make it impossible to take a preventive measure. When people create or receive scientific work through fraud and cheating, it does not lead to scientific growth in themselves and society, and does not add knowledge. When people claim that they are the creators of scientific work but they are not its real owners, they deprive society of knowledge. When one misuses the knowledge created by others, they oppress society

User code	Interview transcript	Open coding
	they deprive society of knowledge. When a person misuses the knowledge created by others, they oppress society and waste his/her talents. The lack of systematic surveillance and scrutiny of scientific work exacerbates this issue of scientific misconduct. The question is whether articles are judged and reviewed accurately and professionally, and top articles are published, or if journals are engaged in favoritism and receiving bribes to get an article published. A journal that publishes an article for money will lose its credibility and reputation. Buying articles and writing articles for others are other cases of scientific misconduct.	and waste his/her talents. The lack of systematic surveillance and scrutiny of scientific work exacerbates this issue of scientific misconduct. The lack of an accurate and professional reviewing process to publish valid articles, the existence of favoritism, and the receipt of bribes and money to get an article published. Buying articles and writing articles for others are other cases of scientific misconduct.
A4	The lack of education for people at different stages of life, including childhood, is a contributing factor to such misbehaviors. Sometimes these misbehaviors occur due to a lack of awareness and knowledge, which can be mitigated with proper education. In advanced countries, violators of the scientific field are treated strictly. A person who commits scientific misconduct is immediately prosecuted by the police and treated and arrested as an offender because, first of all, accurate systems monitor scientific products. They are carefully scrutinized and verified, and the possibility of infringement is almost zero. Secondly, strict laws and regulations have been established to address offenders. One of the reasons for scientific misconduct is the weakness in recruiting efficient and specialized staff. The lack of a precise monitoring system, the dominance of favoritism over regulations, secret and corrupt relationships, and inadequate oversight by the Journal Promotion Commission have made domestic journals vulnerable. Unusual interests and economic surplus, such as writing full-length manuscript articles for others in exchange for money, changing authors' names and submitting them for publication, and copying works and compiling them as new articles, are	Sometimes these misbehaviors occur due to lack of awareness and knowledge which can be mitigated with proper education. A person who commits scientific misconduct is immediately prosecuted by the police and treated as an offender, and may be arrested. Accurate systems monitor scientific products, and they are carefully scrutinized and verified. Strict laws and regulations have been established to address offenders. One of the reasons for scientific misconduct is the weakness in the recruitment of efficient and specialized staff. The lack of a precise monitoring system, the dominance of favoritism over regulations, secret and corrupt relationships, and inadequate oversight by the Journal Promotion Commission have made domestic journals vulnerable. Unusual interests and economic surplus, such as writing full-length manuscript articles for others in exchange for money, changing authors' names and submitting them for publication, and copying works and compiling them as new articles, are

User code	Interview transcript	Open coding
	and compiling them as new articles, are other examples of scientific misconduct. A paper or scientific work that is created should address national problems or contribute to the advancement of knowledge. Articles and scientific works that do not meet these criteria are unable to solve the country's problems and may even exacerbate the complexity of the issues.	other examples of scientific misconduct. A paper or scientific work that is created should be able to address national problems or at least contribute to the advancement of knowledge. Articles and scientific works that do not meet these criteria are unable to solve the country's problems and may even exacerbate the complexity of the issues.
A5	The reason some journals are blacklisted in Iran and other countries is that they lack a professional and competent editorial board or are not affiliated with reputable scientific centers, and their articles are not subject to expert review. The lack of precise promotion laws and the absence of strict supervisory rules in reviewing a person's resume may provide grounds for scientific misconduct and lead to immoral behaviors. The adoption of a research-centered approach by universities and academic centers and the lack of a scientific production control system are other causes of this phenomenon because their emphasis is on enhancing the educational level of the university and faculty members and if an intelligent syste does not examine scientific products,m they may result in scientific populism. The unplanned admission of students to graduate programs, the lack of close monitoring of their research work, and the absence of clear rules and regulations in dealing with opportunistic individuals have created a thriving environment for the purchase and sale of scholarly works. Credentialism, or an obsession with paper qualifications, and the lack of regulations on admitting students to postgraduate programs, as well as the admission of unqualified applicants to such programs, are other factors contributing to scientific populism. Paying attention to quantity rather than quality is an essential factor in scientific production. Data manipulation, dummy data generation, wrong data processing,	Some journals do not have a professional and competent editorial board or are not affiliated with reputable scientific centers, and their articles are not expertly reviewed. The lack of precise promotion laws and the absence of strict supervisory rules in reviewing a person's resume may provide grounds for scientific misconduct and lead to immoral behaviors. The lack of a scientific production control system is another contributing factor to this phenomenon. If an intelligent system fails to critically examine scientific products, it may lead to scientific populism. The unplanned admission of students to graduate programs, the lack of close monitoring of their research work, and the absence of clear rules and regulations in dealing with opportunistic individuals have created a thriving environment for the purchase and sale of scholarly works. Credentialism, an obsession with paper qualifications, and the lack of regulations on admitting students to postgraduate programs, as well as the admission of unqualified persons to such programs, are other factors contributing to scientific populism. Paying attention to quantity rather than quality is an essential factor in scientific production. Data manipulation, dummy data generation, wrong data processing, scientific laziness, inadequate monitoring of student work, copying, and plagiarism are some strategies

User code	Interview transcript	Open coding
	scientific laziness, inadequate monitoring of student work, copying, and plagiarism are some strategies taken by offenders. The lack of an intelligent system for checking papers and theses The lack of a protection law for those who are exposed to plagiarism These issues undermine the country's scientific credibility in the international community. The inefficiency of knowledge production in the country is another consequence. Non-compliance with professional ethics and the prevalence of scientific populism in society, as well as its induction in the next generation, is another consequence. Not to depreciate plagiarism harms the scientific community.	taken by offenders. The lack of an intelligent system for checking papers and theses The lack of a protection law for those who are exposed to plagiarism These issues undermine the country's scientific credibility in the international community. The inefficiency of knowledge production in the country Non-compliance with professional ethics and the prevalence of scientific populism in society, and inducing it in the next generation Not depreciating plagiarism

Axial Coding

In this stage, the researcher selects an open coding category, examines it (as the main category or phenomenon) at the center of the process, and then links the other categories to it. Other categories include causal conditions (factors affecting the main category), and consequences (outcomes of strategies). Axial coding is performed by drawing a figure known as the coding diagram (Hsieh & Shannon, 2005). Figure 2 illustrates the relationship between causal conditions, strategies, environmental conditions, contextual conditions, and the consequences of using the qualitative analysis introduced by Strauss and Corbin (1998).

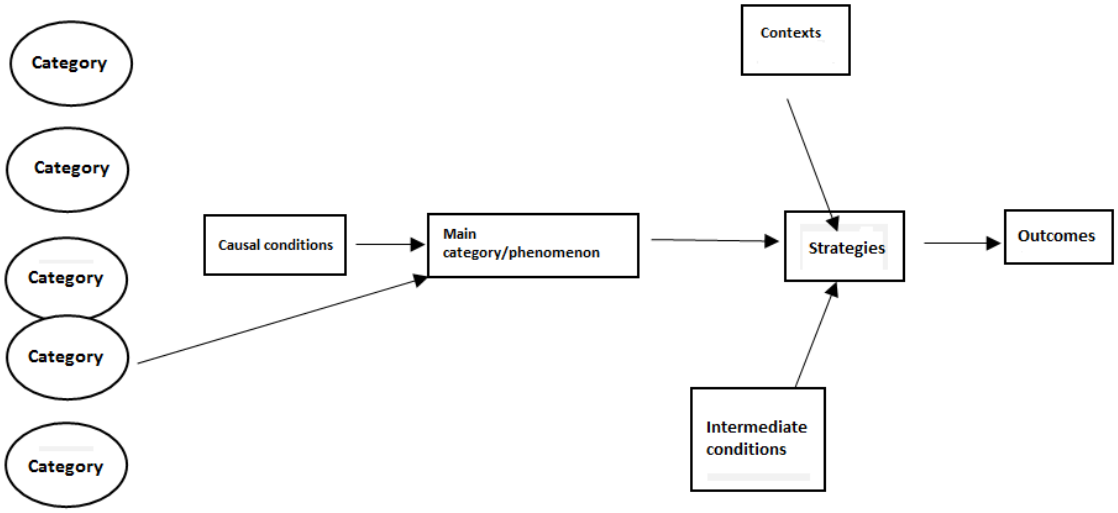

Figure 2: Qualitative analysis from open coding to axial coding

Table 3 shows the steps taken to perform axial coding.

Table 3
Axial coding of the data collected from the interviews with the participants

User code	Open coding	Axial coding
A1	Some people seek reputation and fortune through nepotism, utilizing job opportunities, paying bribes, and engaging in the buying and selling of influence.	Gaining reputation, position, wealth, and social standing
A3	Favoritism and nepotism instead of meritocracy, abuse of one's position and power, the acquisition of wealth and reputation by buying and selling scholarly works	Societal anomalies, the lack of effective and strict laws and regulations to deal with corruption and offenders
A3	Societal anomalies, cultural problems, and the lack of statutory and updated laws to deal with abusive individuals lead to scientific misconduct and abuse.	Material motives to gain wealth, power, position, and social standing
A3	Writing and publishing articles for others by some people or groups in exchange for money, a position, or special privileges	
A6	Scientific misconduct to gain reputation and promotion, or to be appointed to a position.	
A6	Material motives to gain wealth, power, position, and social standing lead to scientific misconduct gaining reputation and position through cheating and misconduct	Disbelief in the world of creation
	Disbelief in the world of creation and the fact that this world is a rule-governed system leads the person to engage in all kinds of immorality and misconduct, and they plan their illegal actions accordingly.	Sensual desires and self-interest motives
	A person who is appointed to a position or gets a promotion through scientific misconduct, fraud, and others' support, /will have the feeling of guilt and shame, and the feeling of internal dissatisfaction results in tension and discomfort.	The feeling of guilt and internal discomfort
A1	The lack of effective laws and regulations to deal with those who engage in scientific	The lack of effective laws and regulations to deal with those who

User code	Open coding	Axial coding
A1	misconduct	engage in scientific misconduct
A4	The mismatch between the crime and the imposed penalty, the lack of proper regulations, and not joining the Copyright Act	The lack of proper regulations and not joining the Copyright Act
A4	The absence of a penal code that fits the crimes committed by people cannot make it impossible to take preventive measures.	The absence of a penal code fitting the crimes committed by people
A4	When people create or receive scientific work through fraud and cheating, it does not lead to scientific growth in themselves or society, and it does not add to knowledge.	Scientific misconduct does not lead to scientific growth in individuals and society, and does not contribute to the advancement of knowledge.
A6	When people claim to be the creators of scientific work but are not its actual owners, they deprive society of knowledge.	Individuals who engage in scientific misconduct deprive society of valuable knowledge and render the scientific community vulnerable.
A6	When one misuses the knowledge created by others, they oppress society and waste his/her talents.	Wasting talents due to scientific misconduct and immorality
A6	The lack of systematic surveillance and scrutiny of scientific work exacerbates this issue of scientific misconduct.	Buying articles and writing articles for others
A6	The lack of an accurate and professional reviewing process to publish valid articles, the existence of favoritism, and the receipt of bribes and money to get an article published.	
	Buying articles and writing articles for others are other cases of scientific misconduct.	
A1	Misbehaviors and offenses occur due to a lack of awareness and knowledge, which can be mitigated with proper education.	The lack of awareness and knowledge
A2	A person who commits scientific misconduct is immediately prosecuted by the police and treated as an offender, and may be arrested.	The absence of effective regulations and rules to deal with offenses
A2	Accurate systems monitor scientific products, and they are carefully scrutinized and verified.	The lack of an intelligent system to control scientific productions and works
A2	Strict laws and regulations have been established to address offenders.	
	One of the reasons for scientific misconduct is the weakness in recruiting efficient and specialized staff.	The weakness in the recruitment of efficient and specialized staff

User code	Open coding	Axial coding
A5	The lack of a precise monitoring system, the dominance of favoritism over regulations, secret and corrupt relationships, and inadequate oversight by the Journal Promotion Commission have made domestic journals vulnerable.	The dominance of favoritism over regulations
A5	Unusual interests and economic surplus, such as writing full-length manuscript articles for others in exchange for money, changing authors' names and submitting them for publication, and copying works and compiling them as new articles, are other examples of scientific misconduct.	The lack of a precise monitoring system, the dominance of favoritism over regulations, secret and corrupt relationships, and inadequate oversight by the Journal Promotion Commission have made domestic journals vulnerable.
A6	A paper or scientific work that is created should address national problems or generate new knowledge.	Unusual interests and economic surplus, writing full-manuscript articles for others by receiving money, changing authors' names and submitting them for publication, and copying some works and putting them together as a new article
A9	Articles and scientific works that do not meet these criteria are unable to solve the country's problems and may even exacerbate the complexity of the issues.	Scientific products should solve national issues and problems. Articles and scientific works produced through cheating and fraud are not applicable and may even exacerbate the complexity of problems.
A1	Some journals lack a professional and competent editorial board or are not affiliated with reputable scientific centers, resulting in articles that are not expertly reviewed.	The weakness of the editorial board is that it lacks affiliation with reputable scientific centers and does not undergo professional review of articles.
A1	The lack of precise promotion laws and the absence of strict supervisory rules in reviewing a person's resume may provide grounds for scientific misconduct and lead to immoral behaviors.	The lack of precise promotion laws and the absence of strict supervisory rules in reviewing a person's resume
A1	The lack of a scientific production control system is another contributing factor to this phenomenon.	Credentialism (obsession with paper qualifications) and the lack of regulations on admitting students to postgraduate programs
A1	If an intelligent system fails to examine scientific products critically, it may lead to scientific populism.	Paying attention to quantity instead of quality in scientific productions
A1	Unplanned admission of students to graduate programs, and the lack of close monitoring of their research work	
A1	Credentialism (obsession with paper qualifications) and the lack of regulations on	

User code	Open coding	Axial coding
A4	admitting students to postgraduate programs The lack of rules and regulations in dealing with opportunistic people has created a thriving environment for the purchase and sale of scholarly works. Paying attention to quantity rather than quality Data manipulation, dummy data generation, wrong data processing, scientific laziness, inadequate monitoring of student work, copying, and plagiarism The lack of an intelligent system for checking papers and theses Undermining the country's scientific credibility in international communities The inefficiency of knowledge production in the country Non-compliance with professional ethics and the prevalence of scientific populism in society and inducing it in the next generation Not depreciating plagiarism	Data manipulation, dummy data generation, wrong data processing, scientific laziness, inadequate monitoring of student work, copying, and plagiarism The lack of a protection law for those who are exposed to plagiarism Undermining the country's scientific credibility in international communities The inefficiency of knowledge production in the country Non-compliance with professional ethics and inducing it in the next generation Not depreciating plagiarism
A4		

Selective coding

At this stage, the researcher develops a theory based on the categories extracted from the axial coding model (Table 4). Initially, this theory provides an explanation of the process under analysis. This is achieved by integrating and refining the theory to give an anecdotal account of the relationships between the categories, based on the researcher's technical notes (Thomas, 2006).

Table 4

Selective coding of the data collected from the interviews with the participants

User code	Axial coding	Selective coding
A1	Disbelief in the system of creation The acquisition of reputation, power, position, wealth, and social standing Material motives to gain wealth, power, position, and social standing Sensual desires and self-interest	Disbelief in the system of creation Material motives to gain wealth, power, position, and social standing
A3	Cultural anomaly, lack of effective laws and regulations to combat corruption and offenders The lack of education and awareness The lack of a protection law for those who are exposed to plagiarism The lack of laws and regulations to deal with crimes and offenses	Cultural and social anomalies The lack of protection laws and penal regulations to deal with scientific populism
A3		

User code	Axial coding	Selective coding
A3	The lack of effective rules and non-compliance with the Copyright Act The lack of an intelligent system for controlling scientific works The lack of punitive laws commensurate with the crimes committed by abusive people	The lack of an intelligent system for detecting offenses in scientific products The dominance of nepotism over regulations
A6	The lack of an intelligent system for controlling scientific productions and works The lack of precise and effective rules and regulations to deal with people engaging in scientific misconduct The weaknesses of promotion rules and weaknesses in regulatory laws to check people's working records	The weaknesses in the employment of skilled and efficient staff Weak reviews and a lack of proper monitoring in some journals
A6	Credentialism (obsession with paper qualifications) and the lack of regulations on admitting students to postgraduate programs Paying attention to quantity rather than quality in scientific production Weaknesses in the employment of skilled and efficient staff The lack of a precise monitoring system, the dominance of favoritism over regulations, secret and corrupt relationships, and the lack of close monitoring by the Journal Promotion Commission Weak reviews and a lack of proper monitoring in some journals	Resorting to scientific misconduct to get promoted Inefficiency of scientific production in solving national problems Not depreciating plagiarism
	Buying and selling articles and writing articles for others Data manipulation, dummy data generation, wrong data processing, scientific laziness, inadequate tracking of student work, copying, and plagiarism Unusual interests and economic surplus, writing full-manuscript articles for others by receiving money, changing authors' names and submitting them for publication, and copying some works and putting them together as a new article A paper or scientific work that is created should address national problems or contribute to the advancement of knowledge. Articles and scientific works produced through cheating and fraud are not applicable and may even exacerbate the complexity of problems. Undermining the country's scientific credibility in international communities The inefficiency of science production in the country Non-compliance with professional ethics and inducing it in the next generation Not depreciating plagiarism Feeling unrest, inner dissatisfaction, and guilt/shame as a result of scientific misconduct Scientific misconduct does not lead to scientific	Undermining the country's scientific credibility in international communities Non-compliance with professional ethics and inducing it in the next generation Mental harm was inflicted on people who engaged in scientific misconduct. Hindering scientific growth and harming the scientific production cycle Wasting talents, time, and energy in scientific communities

User code	Axial coding	Selective coding
	growth in individuals and society, and does not contribute to existing knowledge. Individuals who engage in scientific misconduct deprive society of valuable knowledge and render the scientific community vulnerable. Wasting talents due to scientific misconduct and immorality	

Discussion

Nowadays, research misconduct, scientific deception, and fabrication of data have led to non-compliance with ethical and scientific standards in research. Such scientific misconduct has gone through a growing trend in recent years, and thus academics, decision-makers, researchers, students, and even other community members need to identify and prevent it (Renard, 1999). According to various studies, the number of retractions increased each year (Van Noorden, 2023). China, the USA, and Iran have a high number of scientific misconducts in the world (Heitman & Litewka, 2011; Zhu, Jia & Leung, 2024). In the wake of the increasing attention being given to the rise of scientific rankings worldwide, plagiarism, scientific populism, and non-compliance with research ethics are equally denounced throughout the scientific community. Increased competition in science, pressure to produce more articles, and lower quality of science have led to the highest number of scientific misconducts committed in Electrical Engineering, Electronics, Computer Science, and Clinical and Life Sciences, and the lowest cases of scientific misconduct in Arts and Humanities. Besides, scientific misconduct is most frequently committed during the publishing process, followed by data manipulation, and least frequently in the form of idea theft. Such behaviors have led to unfavorable conditions at major universities around the world (Jamali, Ghazinoory, & Sadeghi, 2014; Li & Shen, 2024). This study examined various types of scientific misconduct based on several criteria, including plagiarism, deliberate self-citation, idea theft, author abuse, breaches of the code of ethics by authors, interventions in the review process, and scientific demagoguery. Accordingly, this study tried to develop a suitable paradigm for explaining the concept of populism using the data collected through interviews with several Iranian researchers and scholars.

From the extracted categories, a focal category is selected as the central phenomenon. After specifying the number of categories (depending on the volume of data), this category is chosen as the basis for developing the theory. The central axis or central phenomenon is the main research problem. Causal conditions are categories that explain the central and influential reasons for the central process. The underlying causes and factors of scientific populism include the factors that enable individuals to play a significant role in inducing scientific populism. Intervening factors include those that facilitate the process of scientific

populism, and their absence prevents it. The results of this study are presented as a paradigmatic model of scientific populism displayed in Figure 3

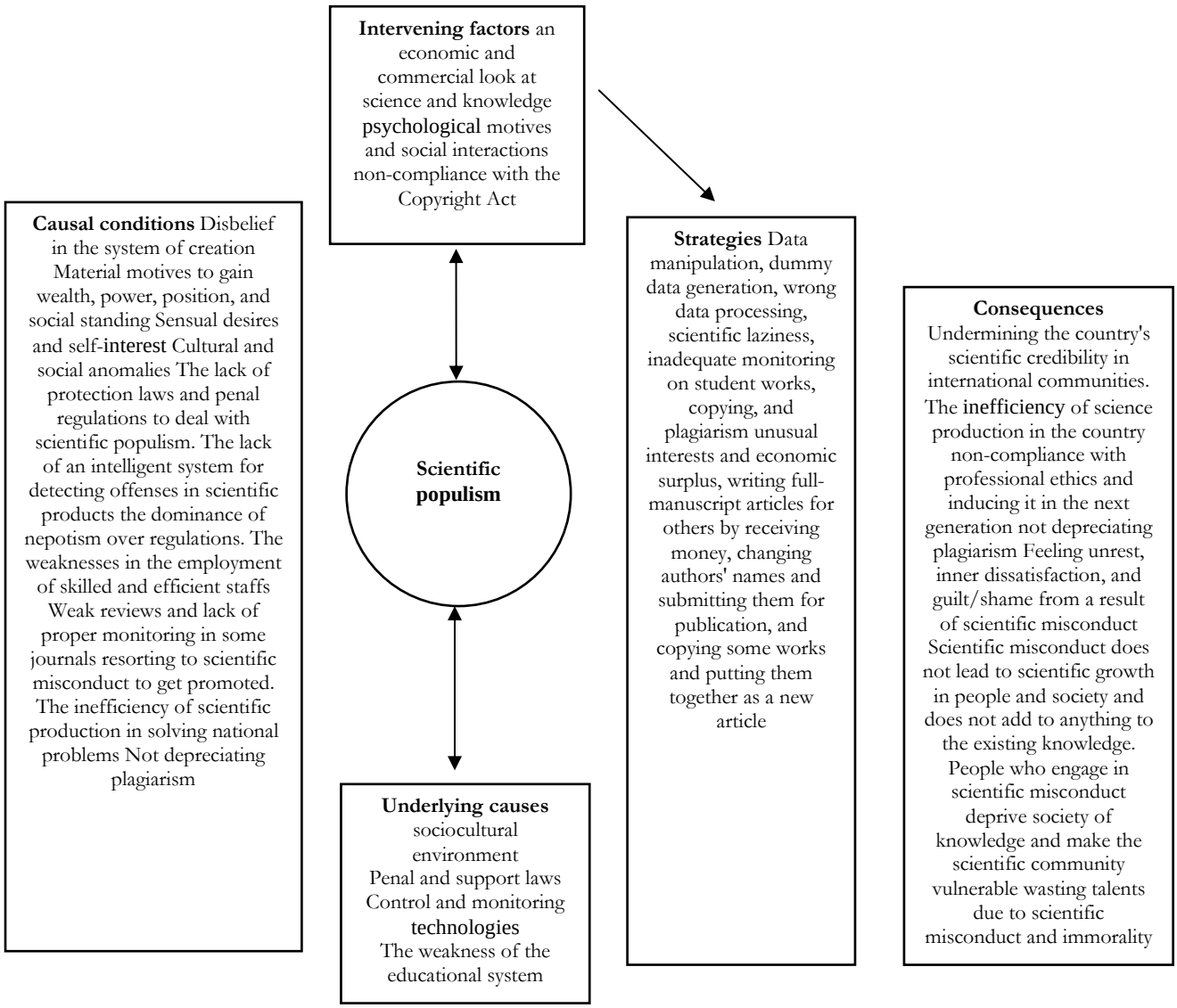

Figure 3: The theoretical paradigm of scientific populism

As illustrated in Figure 3, the main research category (phenomenon) is positioned at the center of the presented model, and the other identified categories are then linked to it. “Causal conditions” are related to the “main category” by a one-sided arrow, indicating that the existence of these conditions reinforces the main category and their absence weakens the main category. The “underlying causes” and the “intervening factors”, in contrast, are linked to the “main category” with the two-sided arrows, indicating that the two categories, together with their subcategories, can influence the main category, and at the same time are affected by it. This suggests that if the categories and sub-categories are taken into account and the weaknesses are eliminated and minimized, the level of scientific populism in the country's scientific community will decrease. Furthermore, the elimination of these factors can reduce the likelihood of populist behaviors recurring in academic and scientific fields. According to our findings, the "main category" is also linked to "strategies," which means that in the scientific environment, individuals may employ various strategies and actions to achieve their desired results.

According to the proposed model, the causal conditions that interviewees considered to lead to scientific populism include: Disbelief in the system of creation material motives to gain wealth, power, position, and social standing, sensual desires and self-interest, cultural and social anomalies, the lack of protection laws and penal regulations to deal with scientific populism, the lack of an intelligent system for detecting offences in scientific products, the dominance of nepotism over rules, the weaknesses in in the employment of skilled and efficient staffs, weak reviews and lack of proper monitoring in some journals resorting to scientific misconduct to get promoted, the inefficiency of scientific production in solving national problems, and not depreciating plagiarism.

Additionally, several intervening factors influence the main category, including economic and commercial perspectives on science, psychological incentives, social interactions, and non-compliance with the Copyright Act. In the presented model, the causes and factors governing populist behaviors are categorized into four subcategories: sociocultural, punitive and supportive laws, control and surveillance technologies, and weaknesses in the education system. Finally, some strategies that opportunistic people may employ in pursuit of scientific populism are detailed including data manipulation, dummy data generation, wrong data processing, scientific laziness, inadequate monitoring on student works, copying, and plagiarism, unusual interests and economic surplus, writing full-manuscript articles for others by receiving money, changing authors' names and submitting them for publication, and copying some works and putting them together as a new article.

The proposed model comprises six components: the central phenomenon, causal conditions, underlying causes, strategies, intervening factors, and consequences. Each of these sections contains categories and indicators extracted from in-depth interviews with the participants.

In their study, Stretton et al. (2012) concluded that an increase in the number of offenses, including scientific misconduct, in the community will likely be problematic for individuals living there. Plagiarism and other forms of misconduct in the scientific community are the results of widespread immoral behaviors in society. Therefore, to prevent the growing trend of scientific misconduct, its roots must be addressed. The authors examined the interactions between cognitive, familial, physiological, psychological, social, managerial, economic, political, and cultural considerations to identify the potential causes and adverse effects of plagiarism and scientific misconduct, drawing on expert opinions. The findings of the present study align with those of Stretton et al. (2012).

The results of the present study are also consistent with the results of a survey by Ehrich, Howard, Mu and Bokosmaty (2016) who emphasized the protection of the moral and legal rights of authors regarding the ownership of literary and scientific works and the establishment of international communication in the field of research and exchange of knowledge, and its ethical and legal processes, and the necessity of reviewing existing laws. The authors also emphasized the importance of adopting a policy to protect intellectual and artistic property rights and adhering to the global treaty, which necessitates the gradual development of cultural, economic, moral, and legal infrastructures to prevent scientific misconduct.

Conclusion

Besides, scientific populism can be promoted when control and surveillance technologies

cannot be used or when the country's education system is weak, as supported by observations made by previous researchers (e.g. Yadav, Rawal & Baxi, 2016; Gullifer & Tyson, 2014) who concluded that poor education and lack of systematic supervision are essential factors leading to scientific populism. We hope that the findings of this study will be considered as evidence for the necessity of combating demagogical scientific misconduct and provide a benchmark for identifying it. Based on these findings, future research could explore the underlying causes and potential solutions for addressing the factors contributing to scientific populism. Studies could examine interventions to strengthen research ethics, develop more effective systems for detecting scientific misconduct, and improve review and assessment protocols in academic journals. Additionally, exploring the role of institutional policies and employment regulations in either mitigating or exacerbating scientific populism could offer valuable insights. Cross-disciplinary and cross-cultural research could further enhance understanding of how these factors manifest differently across scientific fields and regions.

Declaration of conflicting interests

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References

Babaii, E. & Nejadghanbar, H. (2017). Plagiarism among Iranian graduate students of language studies: Perspectives and causes. *Ethics & Behavior*, 27(3), 240-258. https://doi.org/10.1080/10508422.2016.1138864

Batane, T. (2010). Turning to Turnitin to fight plagiarism among university students. *Journal of Educational Technology & Society*, 13(2), 1-12.

Brownson, R. C. (2017). *Dissemination and implementation research in health: Translating science to practice*. Oxford University Press.

Bugaric, B. (2008). Populism, liberal democracy, and the rule of law. *Communist and Post-Communist Studies*, 41(2), 191-203. https://doi.org/10.1016/j.postcomstud.2008.03.006

Charmaz, K. & Belgrave, L. L. (2007). Grounded theory. In *The Blackwell Encyclopedia of Sociology* (pp. 2023-2027). Blackwell Publishing Ltd. https://doi.org/10.1002/9781405165518.wbeosg070

Choudhry, H. S., Anur, S. M., Choudhry, H. S., Kokush, E. M., Patel, A. M. & Fang, C. H. (2024). Retracted publications in otolaryngology-head and neck surgery: What mistakes are being made? *OTO Open*, 8(2), e157. https://doi.org/10.1002/oto2.157

Conniff, M. L., Roberts, K., Basurto, J., Drake, P. W. & Ellner, S. (2012). *Populism in Latin America*. The University of Alabama Press.

de Vrieze, J. (2021). A large survey finds questionable research practices are common. *Science*, 373(6552), 265. https://doi.org/10.1126/science.373.6552.265

Ehrich, J., Howard, S. J., Mu, C. & Bokosmaty, S. (2016). A comparison of Chinese and Australian university students' attitudes towards plagiarism. *Studies in Higher Education*, 41(2), 231-246. https://doi.org/10.1080/03075079.2014.927850

Ellen, D., Day, S. & Davies, C. (2018). *Scientific examination of documents: Methods and techniques*. CRC Press. https://doi.org/10.4324/9780429491917

Erman, I. (2018). Autobiography of a 'Living Plagiary': Vasilii rozanov's secret dostoevskian genealogy. *AvtobiografiЯ*, 7, 171-190. https://doi.org/10.25430/2281-6992/v7-171-190

Featherstone, D. (2015). Revolt on the Clyde side? Space, politics, and populism. *Geoforum*, 62, 193–195. https://doi.org/10.1016/j.geoforum.2015.04.007

Glaser, B. G. & Strauss, A. L. (2017). *Discovery of grounded theory: Strategies for qualitative research*. Routledge.

Gullifer, J. M. & Tyson, G. A. (2014). Who has read the policy on plagiarism? Unpacking students' understanding of plagiarism. *Studies in Higher Education*, 39(7), 1202-1218. https://doi.org/10.1080/03075079.2013.777412

Hamner, W. M. & Robison, B. H. (1992). In situ observations of giant appendicularians in Monterey Bay. *Deep-Sea Research Part A. Oceanographic Research Papers*, 39(7-8), 1299-1313. https://doi.org/10.1016/0198-0149(92)90070-A

Hamrahi, A., Pournaghi, R. & Matlabi, D. (2023). Conceptual framework of components and indicators of the scholarly publication system: Systematic review. *International Journal of Information Science and Management (IJISM)*, 21(4), 103-130. https://doi.org/10.22034/ijism.2023.1977992.0 or https://dor.org/20.1001.1.20088302.2023.21.4.6.2

Han, S., Li, K., Gao, S., Zhang, Y., Yang, X., Li, C., Wang, Y., Li, L., Zhao, Y., & Wang, Z. (2023). Research misconduct knowledge and associated factors among nurses in China: A national cross-sectional survey. *Applied Nursing Research*: ANR, 69, 151658. https://doi.org/10.1016/j.apnr.2022.151658

Hancevic, P., Cont, W. & Navajas, F. (2016). Energy populism and household welfare. *Energy Economics*, 56, 464–474. https://doi.org/10.1016/j.eneco.2016.03.027

Hawkins, K. A., Carlin, R. E., Littvay, L. & Kaltwasser, C. R. (Eds.). (2018). *The Ideational Approach to Populism: Concept, Theory, and Analysis*. Routledge.

Heitman, E. & Litewka, S. (2011). International Perspectives on Plagiarism and Considerations for Teaching International Trainees. *Urologic Oncology*, 29(1), 104-108. https://doi.org/10.1016/j.urolonc.2010.09.014

Heuritsch, J. (2023). Reflecting on motivations: How reasons to publish affect research behaviour in astronomy. *PLoS ONE*, 18(4), e0281613. https://doi.org/10.1371/journal.pone.0281613

Hsieh, H. F. & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288. https://doi.org/10.1177/1049732305276687

Jamali, R., Ghazinoory, S. & Sadeghi, M. (2014). Plagiarism and ethics of knowledge: Evidence from international scientific papers1. *Journal of Information Ethics*, 23(1), 101-110.

Kohler, S. & Koinig, I. (2023). The effect of science-related populism on vaccination attitudes and decisions. *Journal of Behavioral Medicine*, 46(1-2), 229-238. https://doi.org/10.1007/s10865-022-00333-2

Li, M. & Shen, Z. (2024) (Editorial). Science map of academic misconduct. *The Innovation*, 5(2), 100593. https://doi.org/10.1016/j.xinn.2024.100593

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications, Inc.

Marsh, R. L. & Landau, J. D. (1995). Item availability in cryptomnesia: Assessing its role in two paradigms of unconscious plagiarism. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 21(6), 1568. https://psycnet.apa.org/doi/10.1037/0278-7393.21.6.1568

Matsen, E., Natvik, G. & Torvik, R. (2016). Petro populism. *Journal of Development Economics*, 118, 1–12. http://dx.doi.org/10.1016/j.jdeveco.2015.08.010

Maxwell, J. A. (1996). *Qualitative research design: An interactive approach*. Thousand Oaks, CA: Sage.

Mede, N. G. & Schäfer, M. S. (2020). Science-related populism: Conceptualizing populist demands toward science. *Public Understanding of Science*, 29(5), 473-491. https://doi.org/10.1177/0963662520924259

Mede, N. G. & Schäfer, M. S. (2022). Science-related populism declining during the COVID-19 pandemic: A panel survey of the Swiss population before and after the Coronavirus outbreak. *Public Understanding of Science*, 31(2), 211-222. https://doi.org/10.1177/09636625211056871

Mede, N. G., Schäfer, M. S. & Füchslin, T. (2021). The SciPop Scale for Measuring Science-Related Populist Attitudes in Surveys: Development, Testing, and Validation. *International Journal of Public Opinion Research*, 33(2), 273-293. https://doi.org/10.5167/uzh-197157

Mede, N. G., Schäfer, M. S., Metag, J. & Klinger, K. (2022). Who supports science-related populism? A nationally representative survey on the prevalence and explanatory factors of populist attitudes toward science in Switzerland. *Plos One*, 17(8), e0271204. https://doi.org/10.1371/journal.pone.0271204

Mills, J., Bonner, A. & Francis, K. (2006). The development of constructivist grounded theory. *International Journal of Qualitative Methods*, 5(1), 25-35. https://doi.org/10.1177/160940690600500103

Pan, P. (2020). Ethics in research and publication. *Journal of Indian Association of Pediatric Surgeons*, 25(6), 349–351. https://doi.org/10.4103/jiaps.jiaps_219_19

Park, C. (2003). In other (people's) words: Plagiarism by university students--literature and lessons. *Assessment & Evaluation in Higher Education*, 28(5), 471-488. https://doi.org/10.1080/02602930301677

Renard, L. (1999). Cut and paste 101: Plagiarism and the net. *Educational Leadership*, 57(4), 38-42. Retrieved from https://web.mit.edu/21w.784/www/BD%20Supplementals/Materials/Unit%20Two/Plagiarism/cut-n-paste%20ethics.pdf

Sade, R. M., Canver, C., D'Amico, T., Ellis, J., Fenton, K., Freeman, R. & Ohman, L. (2016). Sanctions for research misconduct in cardiothoracic surgery journals. *Journal of Thoracic and Cardiovascular Surgery*, 152 (3), 661-663. https://doi.org/10.1016/j.jtcvs.2016.06.044

Strauss, A. & Corbin, J. (1990). *Basics of qualitative research*: *Grounded theory procedures and techniques.* Sage Publications, Inc.

Strauss, A. & Corbin, J. (1998). *Basics of qualitative research: Techniques & procedures for developing grounded theory*. California: Sage Publications, Inc.

Stretton, S., Bramich, N. J., Keys, J. R., Monk, J. A., Ely, J. A., Haley, C., Woolley, M. J. & Woolley, K. L. (2012). Publication misconduct and plagiarism retractions: A systematic, retrospective study. *Current Medical Research and Opinion*, 28(10), 1575–1583. https://doi.org/10.1185/03007995.2012.728131

Tang, B. L. (2023). Nature and Causes of Questionable Research Practices and Research Misconduct from a Philosophy of Science Perspective. *Ethics & Behavior*, 34(4), 294–302. https://doi.org/10.1080/10508422.2023.2208245

Tijdink, J. K., Verbeke, R. & Smulders, Y. M. (2014). Publication pressure and scientific misconduct in medical scientists. *Journal of Empirical Research on Human Research Ethics*, 9(5), 64-71. https://doi.org/10.1177/1556264614552421

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27(2), 237-246. https://doi.org/10.1177/1098214005283748

Van Noorden, R. (2023). More than 10,000 research papers were retracted in 2023, setting a new record. *Nature*, 624(7992), 479-481. https://doi.org/10.1038/d41586-023-03974-8

Vehviläinen, S., Löfström, E. & Nevgi, A. (2018). Dealing with plagiarism in the academic community: Emotional engagement and moral distress. *Higher Education*, 75(1), 1-18. https://doi.org/10.1007/s10734-017-0112-6

Wills, J. (2015). Populism, localism, and the geography of democracy. *Geo Forum*, 62, 188-189. https://doi.org/10.1016/j.geoforum.2015.04.006

Yadav, S., Rawal, G. & Baxi, M. (2016). Plagiarism is a serious scientific misconduct. *International Journal of Health Sciences and Research*, 6(2), 364-366. Retrieved from https://www.ijhsr.org/IJHSR_Vol.6_Issue.2_Feb2016/52.pdf

Zhu, H., Jia, Y. & Leung, S. W. (2024). Citations of microRNA biomarker articles that were retracted: A systematic review. *JAMA Network Open*, 7(3), e243173. htpps://doi.org/10.1001/jamanetworkopen.2024.3173