



# Get the root of research misconduct: a systematic review of its cultural factors

Wei Feng, Lihong Zhou and Junmin Xiao

DOI: <https://doi.org/10.47989/ir30iConf46903>

## Abstract

**Introduction.** Culture significantly shapes scientists' perceptions of research misconduct (RM) since RM can differ from culture to culture. Yet the absence of a comprehensive understanding of cultural factors affecting RM often results in the oversight of cultural influences when implementing RM-preventing measures.

**Method.** This study adopted a systematic review approach to identify specific cultural factors of RM and conceptualize their influencing relationships with RM.

**Analysis.** Guided by cultural dimension theory, a total of 55 articles were analysed through thematic analysis.

**Results.** Five primary cultural factors emerged: strong authority hierarchy, collectivist culture, self-interested culture, gender roles, and low uncertainty tolerance. These cultural factors, serving as common origins of other typologies of RM factors, were found to indirectly influence RM by interacting with other factors.

**Conclusions.** This review contributes to the theoretical expansion of knowledge on the cultural factors of RM and a conceptual model to understand their relationships with RM. The findings can provide useful implications for developing effective and targeted strategies to mitigate the negative effect of cultural factors on RM.

## Introduction

Nowadays, the evolving and uncertain academic landscape, particularly with the emergence of artificial intelligence (AI) technologies like ChatGPT, requires library and information science (LIS) professionals to environmentally scan factors affecting research misconduct (RM) and extend their roles in research integrity (RI) (Auer & Krupar, 2001; Benjes-Small et al., 2008; Caravello, 2008; Herr, 2019; Seadle, 2023). However, AI does not inherently induce individuals to engage in RM; rather, it merely facilitates the process. It is people's behaviours such as ethical decision-making, cognitive processes, and perceptions of societal values that ultimately determine whether they commit RM or not (Li & Cornelis, 2021; Olesen et al., 2017). Notably, people's behaviours in RM are oriented by various factors but fundamentally shaped by culture (Durham, 1976; Eckstein, 1997; Lonner & Adamopoulos, 1997; Valkenburg et al., 2021).

Culture is a highly intricate concept that remains the subject of considerable debate (G. J. Hofstede, 2015). Briefly, culture is characterized as '*the customary beliefs, social forms, and material traits of a racial, religious, or social group*' (Merriam-Webster, n.d.). Culture plays a significant role in determining what is considered acceptable or unacceptable behaviour within a society. Relating more specifically to research settings, the judgement and acceptance of RM can differ from culture to culture (Farahat, 2022; JAL, n.d.). Thus, scientists might commit RM intentionally driven by unhealthy cultural traits or unintentionally due to unawareness of RI principles in other cultural backgrounds.

To address cultural influences on RM, certain measures on education and training are advocated to improve the ethical awareness of scientists (Rodrigues et al., 2023). Beyond education, cultural reforms are implemented to tentatively drag scientists back to the pure intention of embarking on scientific careers (Casadevall & Fang, 2012). Additionally, some governance models of cultural reforms are proposed to handle RM (Schiermeier, 2010; Schocker et al., 2021). However, these measures merely play a marginal role in addressing the cultural challenges of RM due to the lack of deep understanding of the specific cultural factors.

There is now an emerging body of work on exploring the factors of RM, primarily encompassing three typologies: individual factors, organizational factors, and professional factors (Feng et al., 2024; Fierz et al., 2014; Haven & van Woudenberg, 2021; Horbach et al., 2019; Wang & Zhu, 2023). While existing studies have explored the impact of cultural norms, values, and practices on RM (Buljan et al., 2018; Davis, 2003; Rodrigues et al., 2023), culture has been merely studied as an explanatory lens for RM rather than as a typology of direct or indirect factors. There is still a lack of comprehensive understanding and in-depth analysis regarding specific cultural factors, their interaction with other typologies of RM factors, and the mechanism of how they shape the attitudes of scientists towards RM.

To bridge these gaps in RM studies, the present study aims to delve deeper into the specific cultural factors of RM beyond superficial observations and explanations. Theoretically, the analysis of the present study contributes to a more nuanced understanding of cultural factors affecting RM and their relationships with RM. Practically, the cultural-factor map of RM developed by the present study can be utilized by interest groups to navigate the complex cultural landscape and thus to work towards implementing effective and targeted strategies. Hence, the following research questions are of significant concern in the present study:

- What are the cultural factors that influence RM?
- What are the relationships between RM and its cultural factors?

## Literature review and theoretical basis

### Research misconduct

Based on an overview of RM definitions issued by different research institutions across various research disciplines (Gilbert & Denison, 2003), early definitions tend to be inclusive and generic, not specifying what is RM and what is not. For instance, in the 1990s, the US National Science Foundation simply defined RM as serious deviations from generally accepted practices in a particular scientific discipline (Bornmann, 2013; Buzzelli, 1993). This kind of definition leaves more room and freedom to work against all potential forms of aberrant conduct (Bornmann, 2013).

The most widely used definition, coined by the Office of Science and Technology Policy (OSTP) of the US White House (The Office of Science and Technology Policy, 2000), refers to '*fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results*'. This definition specifically points out what is not acceptable, and what is an offence against the rules of good scientific practice. In this definition, fabrication is making up data, processes, and results and claiming them as real. Falsification means the manipulation of research data, materials, equipment, or processes to yield a better research outcome. Plagiarism refers to untruthful reports of research processes and results or using other people's work or ideas without acknowledging the source.

In recent years, the international academic community has observed a surge in instances of RM (Martinson et al., 2005; Wang & Zhu, 2023). The persistent occurrence of RM has significantly undermined the credibility and value of scientific research, eroded public trust in the scientific enterprise, and compromised the motivation and morale of scientists to engage in innovative endeavours (Martinson et al., 2005; Nelson & Lubchenco, 2022; Seadle, 2017; Xie et al., 2021). To address the issues of RM, several studies have paid attention to preventing, detecting, correcting, and reporting RM (Bonito et al., 2012; Buljan et al., 2018; Gillespie, 1991; Gunsalus, 2019; Kumar, 2010; Wiedermann, 2018), as well as cultivating and repairing RI (Mejlgaard et al., 2020; Tang, 2019; Titus et al., 2008). Specifically, numerous measures have been implemented, such as integrity training and education, targeting fake peer reviews, strengthening management of science foundations, and providing guidance and policy (Cyranoski, 2017; Y. Gong, 2005; Mejlgaard et al., 2020; Michel, 2010; Yi et al., 2019).

### Factors of research misconduct

The measures of preventing RM are often developed without a deep understanding of the factors of RM, which are characterized by '*secrecy and complexity*' in research (DuBois et al., 2013, p. 321). A comprehensive understanding of the underlying factors of RM can facilitate the prediction of potential RM, the design of targeted interventions, and the formulation of policy decisions and educational initiatives, among other benefits (Fanelli et al., 2015; Farahat, 2022; Horbach et al., 2020; Horbach & Halffman, 2019; Mardani et al., 2020).

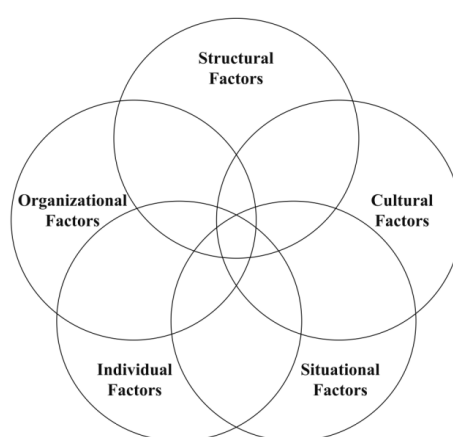
As reported in the existing studies, RM factors can range from individual personality traits, and organizational characteristics to professional causes (Committee on Responsible Science et al., 2017; Fanelli et al., 2022; Feng et al., 2024; Franzen et al., 2007; Horbach et al., 2019; Sovacool, 2008). Some researchers map these three typologies of RM factors to micro, meso, and macro levels respectively, indicating that the factor of RM is a multilevel problem (Faria, 2015; Fierz et al., 2014; Mardani et al., 2020; Schocker et al., 2021). Individual narrative of RM factors suggests the existence of '*scoundrels among scientists*' (Sovacool, 2008, p. 276), informing that individual personality traits such as narcissism, overconfidence, and a lack of ethical values can be major factor of RM (Cairns et al., 2021; Krstić, 2015; Tjeldink et al., 2016). According to Cairns et al. (2021), Mardani et al. (2020), and Tourish and Craig (2020), organizational factors such as institutional pressures, leadership style, and organizational culture can lead to RM. Additionally, professional factors stem from '*professional competitions and pressures among scientists*' (Feng et al., 2024, p. 7). They exist across

organizations and throw threats to the whole academic system, including publication bias, the current research funding system, the pressure to publish (Buljan et al., 2018; Golden et al., 2023; Gopalakrishna et al., 2022; Horbach & Halffman, 2019; Rodrigues et al., 2023), etc. The specific RM factors of these three main typologies, according to Feng et al. (2024), are shown in Table 1.

Themes	Sub-themes (Specific Factors of RM)
Individual Factors	Personal characters
	Lack of ethical awareness
	Lack of experience
	Unstable mental state
	Excessive personal and family pressures
Organizational Factors	Insufficient RI education and training
	Lack of explicit rules and regulations
	Lack of supervision and mentoring
	Lack of punishment and insufficient censure
	Lack of report and transparency on RM
	Misdirected reward system
Professional Factors	'Publish or perish' pressure
	Pressure from grant application
	Pressure from promotion and tenure
	Overly intense peer competition

**Table 1.** Individual, organizational, and professional factors of RM

Besides the above three typologies of RM factors, Davis (2003) developed a conceptual model of RM factors supplementing cultural factors and situational factors. The five typologies of RM factors in Davis's model have an overlapping and parallel relationship with each other as shown in Figure 1. Davis's (2003) model suggested that diverse typologies of RM factors can take effect together on RM. Situational factors refer to stressful and extrinsic circumstances that can encompass situational challenges to scientists and easily induce them to commit RM (Committee on Responsible Science et al., 2017). Since situational factors can be essentially traced back to professional competitions and pressures among scientists (Davis et al., 2007; Faria, 2015), it can be recognized as a combination of organizational factors (i.e. organizational situation) and professional factors (i.e. professional situation) to some extent.



**Figure 1.** The conceptual model of RM factors proposed by Davis (2003)

Davis (2003) brought culture into the research landscape of RM factors, suggesting that scientists may engage in RM in some ways that they may find appropriate but that are not appropriate in other cultures. Factors such as attitudes towards competition, success, and hierarchy (Aubert

Bonn & Pinxten, 2021; Buljan et al., 2018), as well as the emphasis on individual achievement versus collective well-being (Mirshekary & Lawrence, 2009; Parnter, 2022), can contribute to the occurrence of RM and have roots in culture. The influence of culture on RM has been studied with diverse research methods, such as the comparative approach to understand its universality and specificity (Stephens et al., 2010; Williams et al., 2014), literature analysis to construct a comprehensive landscape of cultural contexts (Rodrigues et al., 2023), and theoretical discussions to expand RI from the cultural-practice perspective (Valkenburg et al., 2021). Culture may influence people's behaviours in RM by predisposing them to certain actions, shaping their values, influencing their knowledge acquisition, and structuring distributions of responsibility and accountability (Valkenburg et al., 2021). Despite significant studies exploring the cultural influence on RM, the whole research landscape of cultural factors affecting RM is still fragmentary and obscure. Furthermore, the influencing mechanism between cultural factors and RM behaviours remains underexplored.

Some established cultural theories have been used to explain the cultural factors of RM. For instance, Sellin's (1938) theory of culture conflict has been employed to explicate the factors for the divergent ethical standards among researchers from different nations when facing similar RM issues (Davis et al., 2007; Jesilow et al., 1992; Parnter, 2022). As well, Merton's (1938) theory of social structure and anomie posits that scientists are inclined to engage in RM when societies excessively prioritize socially desirable outcomes (e.g., economic growth) over reasonable and lawful means. For instance, the '*winner-take-all system*' in academia prioritizes breakthroughs in scientific discovery, contributing to an atmosphere in which some scientists attempt to commit RM (Casadevall & Fang, 2012, p. 892; Stern et al., 2014). Nevertheless, these theories only offer one-sided interpretations for the cultural factors affecting RM and does not clearly clarify the influencing mechanism of cultural factors on RM.

### Cultural dimension theory as a theoretical lens

To conceptualize these cultural factors of RM and comprehend the encountered cultural challenges, G. Hofstede's cultural dimension theory is adopted as a theoretical lens. This choice is motivated by the cultural dimension theory's (a) stability over time (G. J. Hofstede, 2015), (b) prevalence across various national cultures globally albeit to varying degrees (G. J. Hofstede, 2015), and (c) application and effectiveness in numerous RM studies to explore potential factors (e.g., Mirshekary & Lawrence, 2009; Olesen et al., 2017; Parnter, 2022; Williams et al., 2014). The initial framework of cultural dimension theory only contained four dimensions (G. Hofstede, 1984). In response to critiques of Western bias, G. Hofstede and Bond (1984) introduced a fifth dimension to specifically address Eastern cultural traits, making the cultural framework highly relevant to the RM issues globally addressed in this paper (Zhou & Nunes, 2013). Until 2010, G. Hofstede had added a sixth dimension to the cultural dimension theory with the cooperation of Michael Minkov (G. Hofstede, 2011; G. Hofstede et al., 2010).

The latest cultural dimension theory consists of the following six dimensions:

- *Power distance* reflects how countries '*handle the fact that people are unequal*' (G. Hofstede et al., 2010, p. 55). It refers to the degree to which less powerful individuals accept and anticipate unequal distribution of power (G. Hofstede, 1994). Societies with high levels of power distance tend to have rigid hierarchies, a strong respect for authority, and a reluctance to challenge those in positions of power.
- *Individualism versus Collectivism* is the degree of integration into groups. Individualism has loose ties between individuals and an expectation of self-care and immediate family. Collectivism has strong in-group ties from birth, often extended families, offering protection for loyalty (G. Hofstede, 1994; G. Hofstede et al., 2010, p. 92).



- *Masculinity versus Femininity*: in masculine societies, where ‘emotional gender roles are clearly distinct’ (G. Hofstede et al., 2010, p. 140), men’s values vary from being assertive and competitive to modest and caring, with a contrast between men’s and women’s values. Feminine societies, where ‘emotional gender roles overlap’ (G. Hofstede et al., 2010, p. 140), have comparable modest and caring values for both genders.
- *Uncertainty Avoidance* describes a society’s tolerance for uncertainty. It reflects the extent to which a culture programs its members to feel comfortable or uncomfortable with ambiguity, uncertainty, and risk (G. Hofstede et al., 2010, p. 140).
- *Long- versus Short-Term Orientation* deals with *Virtue regardless of Truth* (G. Hofstede, 1994, p. 5). Long-term orientation values thrift and perseverance while short-term orientation values tradition, social obligations, and ‘face’ protection (G. Hofstede et al., 2010, p. 237).
- *Indulgence versus Restraint* is ‘related to the gratification versus control of basic human desires related to enjoying life’ (G. Hofstede, 2011, p. 8). The indulgence represents freedom and enjoyment, associated with high happiness, while the opposite reflects restriction and social norms, leading to a feeling of inappropriateness (G. Hofstede et al., 2010, p. 281).

It is worth noting that certain existing studies (Coseglia et al., 2023; Faria, 2015; Haven & van Woudenberg, 2021) have included working or organizational culture in the category of cultural factors affecting RM. However, working, or organizational culture primarily and directly contributes to external factors (e.g., organizational factors, professional factors) rather than internal motivations of people’s behaviours. On the other hand, working or organizational culture represents a situational ‘group identity’ that changes when the working environment changes rather than a typology of ‘culture’ (G. J. Hofstede, 2015, p. 224). Hence, this study does not consider working or organizational culture as the primary cultural factors. Nevertheless, if certain kinds of working or organizational culture are rooted in the cultural dimensions outlined in G. Hofstede’s theory, it is still worthy of discussion in the present study.

## Research methodology

The preliminary review developed theoretical and contextual indications to guide the remaining research stages. It not only confirmed the research questions and research objects but also suggested that the influence of culture on RM should be present, although it is constrained (Davis, 2003; Feng et al., 2024; Mirshekary & Lawrence, 2009; Olesen et al., 2017). This research aims to construct a comprehensive landscape of factors affecting RM and conceptualize their influencing relationships with RM. RM is a complex field and investigations into its cultural factors employ diverse research methods. Mixed studies should be included in the review process to harness the advantages of both quantitative and qualitative evidence (Hong & Pluye, 2018; Petticrew et al., 2013). Thus, a systematic review approach was adopted to “systematically search for, appraise and synthesis research evidence” as suggested by Grant and Booth (2009, p. 102).

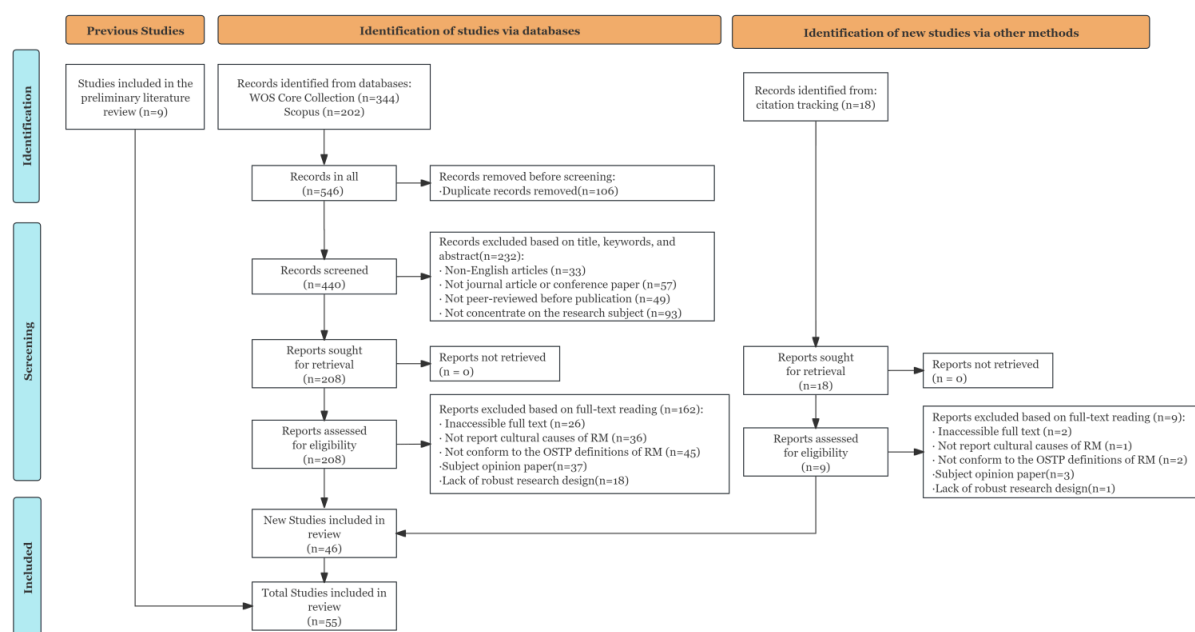
Whilst the preliminary review was designed to be general and wide, the research team intended to follow the systematic review procedures and perform a rigorous analysis focusing on the cultural factors of RM during the main review process. Two international databases, Web of Science Core Collection and Scopus, were employed for literature retrieval. These databases jointly cover the core collection of peer-reviewed research articles published across different disciplines.

Nine studies from the preliminary review (Section 2.2) were first used as references for the retrieval strategy establishment and included in the main review process. The retrieval strategy consisted of two parts for pairing searching: one was about RM, including its synonyms such as academic misconduct and research misbehaviour, as well as several narrower keywords like fabrication, falsification, plagiarism, and academic dishonesty. The other was about “cultural factors”, including its synonyms like cultural determinants, cultural contributors, cultural causes, and so on.

The retrieval strategy was designed to be inclusive of as many relevant articles as possible. To avoid unnecessary dilemmas in the RM definition, the retrieval strategy rigorously adopted the OSTP definition. Given the embedded nature and correspondence of culture in dishonest behaviours proposed by Casadevall and Fang (2012), academic dishonesty behaviours were included when searching relevant articles. The search process was completed between November and December 2023, not restricting the publishing year of articles. The idea is to create a sufficient pool of articles, from which a manual search can be performed.

The database retrieval returned a total of 440 articles after removing duplicated records based on their titles, authors, and publishing year. The research team formed a series of inclusion criteria to guide the identification and screening process. For inclusion, a study must meet the following criteria: (a) it was published in English; (b) it is one of the journal articles or conference proceeding articles; (c) it has been peer-reviewed before publication; (d) its full text is available for download; (e) it must report cultural factors of RM; (f) it must conform the OSTP definition of RM. Adhering to these inclusion criteria, a total of 37 articles were included during the database-retrieval stage.

Thereafter, citation tracking was conducted manually on the included 46 articles (9 from preliminary review and 37 from database retrieval) through Google Scholar, which allowed the identification of relevant articles not obtained from the previous stages. Using this approach, another nine articles were included for analysis after identification and screening with the same inclusion criteria. Finally, a total of 55 relevant articles were included for systematic review analysis. The whole process of selecting articles was demonstrated in the PRISMA diagram (Figure 2) as suggested by Page et al. (2021).



**Figure 2.** PRISMA diagram on article screening processes

The method of thematic analysis was adopted to analyse selected articles, with the cultural dimension theory discussed in Section 2.3 used to guide, orient, and frame the practice of coding. Two authors coded the nine articles from the preliminary review firstly with discussions to formulate the coding agreement and reserved the nine articles from citation tracking in advance for theoretical saturation tests. The full text of all selected articles was imported into MAXQDA Analytics 2020 for inductive coding. In the coding process, the pre-set list of codes was continually examined, confirmed, and updated while new codes were anticipated to emerge from the literature (Saunders et al., 2009). Moreover, three coding

techniques were used, namely open coding, axial coding, and selective coding (Strauss & Corbin, 1998).

## Research findings

The literature analysis pointed to five main cultural factors of RM: strong authority hierarchy, collectivist culture, self-interested culture, gender roles, and low uncertainty tolerance. The themes and codes that emerged from the thematic analysis process are shown in Table 2.

Themes (Cultural Factors)	Codes (Manifestations of Cultural Factors)
Strong authority hierarchy	<ul style="list-style-type: none"> <li>·Pressure to deference</li> <li>·Fear of challenging authority</li> <li>·Limited transparency</li> <li>·Lack of accountability</li> </ul>
Collectivist culture	<ul style="list-style-type: none"> <li>·Loyalty to peers and affiliated institutions</li> <li>·Safeguarding the collective image</li> <li>·Persistence to norms of home countries</li> </ul>
Self-Interested culture	<ul style="list-style-type: none"> <li>·Diluted responsibility among collaborators</li> <li>·Pursuit of personal interest</li> </ul>
Gender roles	<ul style="list-style-type: none"> <li>·More RM cases in male scientists than in females.</li> <li>·Academic society as a masculine society</li> </ul>
Low uncertainty tolerance	<ul style="list-style-type: none"> <li>·Reluctance to innovation</li> <li>·Avoidance of work insecurity</li> <li>·Education practices emphasizing memorization</li> </ul>

**Table 2.** Themes and codes of thematic analysis

### Strong authority hierarchy

The risk of RM is higher in countries that are more hierarchical and less regulated (Fanelli et al., 2015, 2017). In terms of geographic distribution, RM cases are more often reported in some Asian countries like China, Indonesia, and India (Aubert Bonn & Pinxten, 2019; Putra et al., 2023; Rodrigues et al., 2023), which demonstrate high authority hierarchy cultural traits (G. Hofstede et al., 2010, p. 60). The literature analysis revealed some specific manifestations of strong authority hierarchy leading to RM, including pressure to deference, fear of challenging authority, limited transparency, lack of accountability, etc.

Strong authority hierarchy is closely related to a culture of deference to those in positions of authority (G. Hofstede et al., 2010, p. 67), such as principal investigators and senior researchers in academia (Yu et al., 2021). Subordinates working in strongly hierarchical structures are more likely to trust and obey their leaders, as well as recognize their leaders' views and behaviours (Z. Gong et al., 2019; Graham et al., 2018; Peltokorpi, 2019). This has led some students to blindly believe that the information provided by their supervisors is entirely accurate, then directly utilizing this information without critical verification and consequently engaging in RM. The notorious case of Diederik Stapel serves as a classic example of this phenomenon (Retraction Watch, 2016). Furthermore, reports of RM by junior scholars are less likely to be spoken up, let alone be effective in the cultural environment of strong authority hierarchy, as they may fear negative consequences for challenging those with stronger authority (Buljan et al., 2018; Horbach et al., 2020). Limited transparency and openness on RM will therefore be intensified, making it easier for RM to occur without intervention.

More seriously, power-holders in a situation with strong authority hierarchy even have the privilege to, by deliberately misrepresenting information, dictate what is plagiarism, whether plagiarism belongs to the category of RM or not, as well as who should be punished due to RM (Horbach et al., 2019; Putra et al., 2023). In this regard, the lack of accountability and oversight in



the research process will happen since those in positions of authority are less likely to be held accountable for unethical practices (Velayutham & Perera, 2004).

### **Collectivist culture**

The collectivist culture has a significant impact on academic behaviours (Farahat, 2022; Mirshekary & Lawrence, 2009; Parnter, 2022). In collectivist cultures, researchers are connected with some critical social elements like trust, confidence, and cooperation, which are conducive to the emergence of RM behaviours (D. W. Chapman & Lindner, 2016; Tourish & Craig, 2020). Some collectivist cultures prioritize loyalty to peers and affiliated institutions as more important than compliance with RI principles (Bertram Gallant, 2015). This cultural trait has led to an environment where RM is facilitated by institutional protection of wrongdoers and informants' reluctance to divulge any information about RM for the safeguarding of the collective image (Schulz, 2015; Tourish & Craig, 2020). Empirical evidence from Williams et al. (2014) supported this viewpoint by demonstrating that students from collectivist cultures (e.g., the United Arab Emirates and some other nations from the Middle East) were less inclined to take RM as serious violations compared to those from individualist cultures (e.g., the United States).

The diverse cultural landscape within and between countries contributes to varying perceptions of ethically troubling behaviours (Fonseca et al., 2016). Specifically, foreign researchers often face distinct pressures to deviate from established norms in their home society, which do not take some behaviours as RM (Davis, 2003; Davis et al., 2007). This can be attributed to the belief of foreign researchers in the values of their home society out of a collectivist mindset (Parnter, 2022).

However, collectivist culture presents a dual impact on RM. Scientists in collectivist environments exhibit higher levels of self-esteem (Rehman & Waheed, 2014), which is advantageous for RI due to their confidence in research and the desire to protect their reputation and that of their groups (Tijdkink et al., 2016). Additionally, the incidence of RM may decrease with an increasing number of co-authors in a collectivist culture due to enhanced self-control over the content and origin of research (Horbach & Halfman, 2019).

### **Self-interested culture**

The self-interested culture has emerged from literature analysis as an important cultural factor to perpetuate RM behaviours. Scientists in the individualist pole are inclined to do some challenging work including RM to satisfy '*a personal sense of accomplishment*' (G. Hofstede et al., 2010, p. 92), especially when the benefits from RM outweigh the loss (Tourish & Craig, 2020).

Completely different from collectivist cultures, in self-interested cultures, the occurrence of RM can rise when the average number of co-authors on a publication increases since responsibility among authors becomes diluted (Bennett & Taylor, 2003; Horbach & Halfman, 2019; Sun, 2013). Self-interested researchers, who often prevail in placing individual interest above collective interest (G. Hofstede et al., 2010, p. 130), may engage in RM for personal gain disregarding the reputation of their collaborators and their collective (Committee on Responsible Science et al., 2017; Gillespie, 1991; G. Hofstede, 1984; Tourish & Craig, 2020). Contrary to the popular opinion and the stereotype that collectivists like Asians are more likely to plagiarize due to their cultural norms, studies conducted by Kasler et al. (2021) and Martin (2012) support the notion that individualists are more prone to plagiarism due to their pursuit of personal interest.

### **Gender roles**

The thematic analysis demonstrated that gender roles could play an impact on RM behaviours (Aubert Bonn & Pinxten, 2019; Fanelli et al., 2022; Rodrigues et al., 2023). Academia is characterized as a classically masculine society (Bagilhole, 2002; Fotaki, 2013), in which the aggressive, competitive, and assertive psychological characteristics of male scientists predispose them to seek status and take risks through RM (Fanelli et al., 2015, 2017). Data from the US Office of Research

Integrity indicated a higher incidence of RM cases involving male scientists compared to their female counterparts (Fang et al., 2013). Other studies (e.g., Ghias et al., 2014; Gopalakrishna et al., 2022; Mirshekary & Lawrence, 2009; Yu et al., 2021) also illustrated a greater tendency for male scientists or students to engage in RM behaviours. Kaatz et al. (2013) attributed this phenomenon to the implicit gender schema, which potentially contributed to a lower threshold for male scientists to engage in RM, influenced RM case investigations, and affected the distribution of funding between male and female scientists.

While female scientists statistically exhibit fewer RM cases than males, this does not negate the potential influence of femininity on RM. Conversely, feminine cultural traits may influence a collaborative and nurturing approach (G. Hofstede et al., 2010, p. 139), which could contribute to authorship issues such as ghost, guest, or gift authorship during the process of information dissemination (Rodrigues et al., 2023; Smith et al., 2020; Yu et al., 2021).

Although gender can play a role in RM, the statistical relationship between gender roles and RM is not established universally across scientific disciplines (Dannhoferová et al., 2022; Fanelli et al., 2015). Males continue to dominate a significant portion of the academic society and power structure today, suggesting that the link between gender roles and RM may be '*modulated by career or status*' (Fanelli et al., 2015, p. 11). The extent to which gender role contributes to RM also varies across countries, indicating the need for further research in this area (Farahat, 2022).

### **Low uncertainty tolerance**

The literature analysis revealed that nations with low uncertainty tolerance have a high acceptance of RM behaviours. Several comparative studies (e.g., Chapman & Lupton, 2004; Salter et al., 2001) between different countries supported the impact of low uncertainty tolerance on RM. Iranian students, for instance, displayed a greater acceptance of serious RM compared to Australian students. This is reflected in Iran's highest dimension ranking of 'uncertainty avoidance' at 59, indicating a lower tolerance for uncertainty, while Australia's score was 51, indicating a higher tolerance for uncertainty (Mirshekary & Lawrence, 2009). Individuals in societies with low uncertainty tolerance tend to take actions to ensure certainty and are easily caught into "high stress and high anxiety" (G. Hofstede et al., 2010, p. 203), which contribute to RM mainly through certain ways emerged from literature analysis, including reluctance to innovation, avoidance to work insecurity, education practices emphasizing memorization, etc.

The low uncertainty tolerance culture tends to resist the innovative process in organizations (G. J. Hofstede, 2000), as it creates an environment where individuals are uncomfortable with ambiguity and prefer established routines and procedures. This resistance to change and uncertainty can lead to a reluctance to challenge established norms and practices, as people may fear the potential negative consequences or failure that could arise from trying something new (G. Hofstede et al., 2010, p. 169). Consequently, researchers working in such cultures may find it challenging to engage in innovative research (Jam et al., 2018; Kaasa & Vadi, 2010), as they are often discouraged from taking risks or deviating from the status quo (Kaasa, 2016). This fear of negative outcomes and the pressure to conform can sometimes push researchers towards engaging in RM practices, such as data manipulation and fabrication (Kaasa & Vadi, 2010). However, the direct link between the fear of reporting negative results and the engagement in RM is not well-established and requires further investigation.

Additionally, job insecurity is a typical performance of low uncertainty tolerance (Jam et al., 2018; Roll et al., 2015). It, in scientific work, is viewed as a trigger for RM (Davis et al., 2007) because individuals with a low tolerance for uncertainty prefer structured and secure lives, and may feel threatened by job insecurity. Such individuals thus are more likely to resort to RM to enhance their academic performance and reduce insecurity (Afsar & Masood, 2018; Lee et al., 2018; Staufenbiel & König, 2010), especially when the academic society is becoming hypercompetitive.

Education practices prioritizing memorization, replication, and rote learning are accepted by some national cultures like China (G. Hofstede, 1986), which reflect a pursuit of stability and norms, consistent with the cultural trait of low uncertainty tolerance. Although the ability to memorize lectures or source material is often awarded (Madray, 2013), these education practices are admitted to be one of the major factors of plagiarism (Hu & Lei, 2012; James et al., 2019; Rodrigues et al., 2023; Shi, 2006). Scientists who were raised in these education practices are often less tolerant of uncertainty and, therefore, more likely to engage in plagiarism (Dannhoferová et al., 2022; Rodrigues et al., 2023; Vučković et al., 2020). On the one hand, individuals from cultures that rely on memorization are more likely to condone RM behaviours like unattributed information sources in papers due to the lack of critical thinking (James et al., 2019; O'Sullivan & Guo, 2011). On the other hand, replication of original information, instead of being regarded as plagiarism, is sometimes accepted by certain cultures with low uncertainty tolerance as respect for original work, while rational synthesis may be classified into the queue of disrespect (Gregson & Kell, 2009).

## Discussion

The thematic analysis of this systematic review identifies five main cultural factors: strong authority hierarchy, collectivist culture, self-interested culture, gender roles, and low uncertainty tolerance. These five cultural factors align with high power distance, collectivism versus individualism, masculinity versus femininity, and high uncertainty avoidance respectively in G. Hofstede's theory of cultural dimensions. It was observed that certain cultural dimensions (i.e., *High Power Distance*, *High Uncertainty Avoidance*) were unidirectional, with one aspect having an impact. Some cultural dimensions (i.e., *Collectivism versus Individualism*, *Masculinity versus Femininity*) exhibited bidirectional associations with both aspects potentially affecting RM. Thus, G. Hofstede's theory of cultural dimensions can provide plausible explanations for the influence of cultural factors on RM (Zhou & Nunes, 2013). For instance, traditional masculinity norms emphasize competition, dominance, and the pursuit of recognition and prestige (Hofstede et al., 2010, pp. 137-138), fostering an environment where scientists are more inclined to achieve impressive results through RM.

While the cultural dimension of *Long- versus Short-Term Orientation* did not receive support from the selected articles in this systematic review, this does not negate the potential association of cultural characteristics represented by this dimension with RM. For instance, values such as "freedom, rights, achievement, and thinking for oneself" (G. Hofstede & Minkov, 2010, p. 497) are excessively emphasized in short-term-oriented cultures. Within this cultural context, the state or research institutions may employ short-term evaluation methods that tie financial rewards to publications, thereby pressuring and tempting scientists to pursue short-term publications through RM (Franzen et al., 2007). The cultural dimension of *Indulgence versus Restraint* also appears some traits related to RM. For example, indulgence, characterized by a propensity to prioritize personal enjoyment over adherence to strict social norms and ethical standards (G. Hofstede et al., 2010, p. 281), may contribute to RM among researchers due to a potential lack of emphasis on ethical considerations and a greater focus on immediate gratification. Its absence in the explanation of cultural factors affecting RM can probably be attributed to its status as a "truly new" concept, available for less than fifteen years (G. Hofstede et al., 2010, p. 281). The relationships between the cultural factors reflected by these two dimensions and RM need to be further tested in future research.

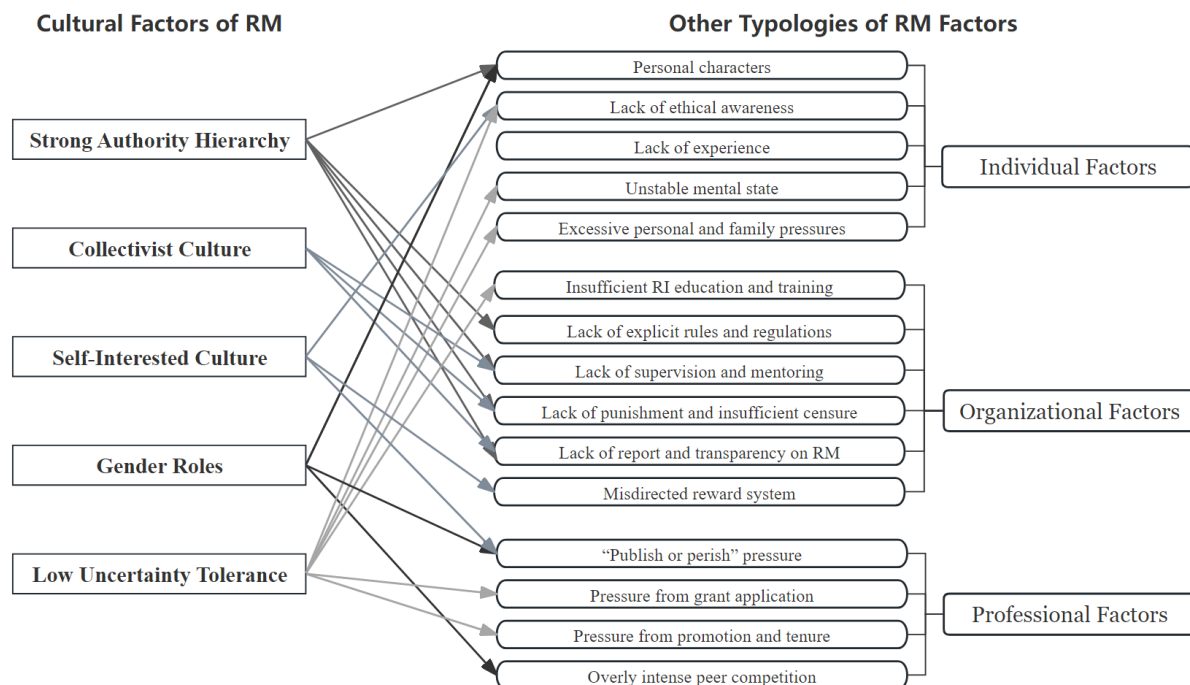
Furthermore, the cultural dimension theory is compatible with other cultural theories in the studies of cultural factors affecting RM. For example, some international students or foreign researchers are likely to commit RM due to the cultural conflict between their home country and host country leading to their divergent awareness of RM, as suggested by Sellin's (1938) theory. As indicated by collectivist culture, researchers who have grown up in collectivist national cultures are more likely to be influenced by and loyal to societal values cultivated in their home country. If

some research behaviours are not accepted as a violation of ethical behaviours in their home countries, it is challenging for them to perceive these behaviours as RM in host countries.

The research findings demonstrated that cultural factors of RM were potentially interrelated with the other three typologies of RM factors that emerged from the preliminary literature review (Table 1), namely individual factors, organizational factors, and professional factors. For instance, ‘strong authority hierarchy’ can contribute to ‘personal characters’ related to pursuing research success through RM, because Tijdink et al. (2016) once stated that,

*Alternatively, more pronounced personality traits may be more strongly associated with research misbehaviour in case of high academic position (moderation) due to researchers in top positions being more focused towards success in research.*

Thus, the research team decided to revisit and reanalyse the selected articles from the preliminary review and the main review together to identify evidence supporting underlying relationships. The reanalysis revealed the potential relationships between cultural factors of RM and other typologies of RM factors as shown in Figure 3.

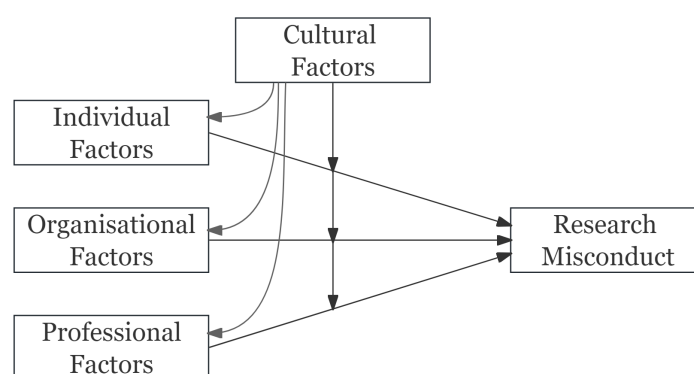


**Figure. 3.** The relationships between cultural factors and other typologies of factors

As depicted in Fig. 3, strong authority hierarchy and collectivist culture are two principal cultural factors that significantly contribute to the organizational factors of RM. Both cultural factors exhibit a predisposition for deference, with strong authority hierarchy emphasizing deference to authority figures, and collectivist culture emphasizing deference to affiliated institutions or group. A self-interested culture can lead to the misdirected reward system and the ‘publish or perish’ pressure in the academic community due to its emphasis on individual gain, recognition, and advancement. This contributes to conditions conducive to RM as individuals might prioritize personal gain over ethical conduct. Additionally, scientists in societies characterized by gender roles, particularly those emphasizing masculinity, may develop certain personal characters such as ‘higher aggression, competitiveness, status-seeking, and risk-taking’ (Fanelli et al., 2015, p. 2). These personality traits might make scientists more susceptible to pursuing academic success through RM and can foster an academic environment with overly intense peer competition.

Moreover, the cultural factors of low uncertainty tolerance have instilled in scientists a mindset that resists innovation and seeks security in research, leading to a propensity for resorting to RM to alleviate this unstable mental state.

Therefore, the present study reveals that the cultural factors can contribute to RM by either leading to or combining with other typologies of RM factors, which is in line with Davis's (2003) perspective. However, different from Davis's (2003) model of RM factors, which portrays different RM factors as parallel and overlapping, this systematic review suggests that cultural factors can serve as motivational factors to the emergence of other typologies of RM factors, thereby establishing common '*social origin*' among them (Horbach et al., 2019, p. 416). Thus, a revised conceptual model on the relationships between RM and its factors is formulated and presented in Figure 4. This model illustrates that cultural factors play an indirect role in RM through taking effects on the emergence (represented by arrows to the left) as well as the influencing process (represented by arrows to down) of other RM factors.



**Figure. 4.** Revised conceptual model of RM factors

Several implications might be drawn from research findings for both theory and practice. First, the present study contributes to research by shifting the focus on the factors of RM from the tripartite narrative perspective (i.e., individual, organizational, and professional) (Sovacool, 2008) to cultural narrative. Moreover, G. Hofstede's cultural dimension theory is visibly useful for understanding the cultural factors of RM, with four out of six dimensions approved as valid. The five main cultural factors of RM that emerged from the present study can serve as a starting point for future studies to explore the cultural impact on RM. Second, the outcomes of the present study reveal that cultural factors are not influencing RM directly. Instead, they appear to interact with other typologies of RM factors (i.e., individual, organizational, and professional factors) in more complex ways. The revised conceptual model of RM factors provides a map to understand the influencing routine from cultural factors as roots to RM behaviours as destinations. Third, the research findings can help interest groups navigate the complex landscape of RM and formulate RM-preventing strategies based on specific cultural factors and their influencing mechanism. Specifically, RI education measures should pay more attention to foreign researchers and students to help them understand the differences in RI principles between their home cultures and the host cultures. As well, culture reforms at both the national and institutional levels, aimed at addressing the cultural influence on RM issues, should be tailored to specifically target the cultural factors affecting RM.

## Conclusion

The present study reports on a systematic review, aiming to investigate the cultural factors of RM and conceptualize their influencing relationships with RM. G. Hofstede's cultural dimension theory was adopted as a theoretical lens to demonstrate that strong authority hierarchy, collectivist culture, self-interested culture, gender roles, and low uncertainty tolerance play a role in RM to



varying degrees. Cultural factors contribute to the connection among other typologies of RM factors and make them no longer separate from each other, thus taking effects together to lead to RM. This systematic review is the first step for theory development, and it can be a solid basis for more empirical studies. To our knowledge, this is one of the earliest studies to construct a comprehensive map of cultural factors affecting RM. Overall, the research findings provide useful insights for interest groups, such as government officers, research institution managers, RI educationists, and information professionals, to develop targeted strategies to mitigate the negative effect of cultural factors on RM. Further, as experts in providing, organizing, locating, and evaluating information, LIS professionals can take on the responsibility of supporting RI and preventing RM guided by the cultural-factor map of RM in the changing academic landscape.

While this study contributes to both theory and practice, certain limitations warrant acknowledgment and should guide future research. First, due to word constraints, the study did not present quite adequate and abundant evidence supporting each code and relationship identified in the thematic analysis. Additionally, the existing literature on the cultural factors influencing RM is limited, resulting in insufficiently robust discussions on some factors. For instance, the exploration of gender tends to rely on stereotypical distinctions between "male" and "female" traits, despite these definitions being drawn from prior studies. Future research should aim for a more nuanced and complex discussion of gender dynamics. Second, while the findings offer plausible explanations for the influence of cultural factors on RM, rigorous empirical studies are required to validate the relationships between RM and specific cultural factors. Particularly, subsequent empirical studies could prioritize the examination of the effects of *Long- versus Short-Term Orientation* and *Indulgence versus Restraint*, which have not been adequately supported by existing research but demonstrate characteristics that impact RM. Third, given that an overreliance on culture as the sole factor of RM is undesirable, it is advisable to study cultural influences on RM in conjunction with other typologies of factors. Especially, there is a need for more cross-cultural studies to compare and contrast the influence of diverse cultural contexts on RM. Fourth, while some measures have been proposed to mitigate the negative impact of culture on RM, it is important to note that cultural factors are not easy to change due to their intricate and persistent nature. As such, future research and practice should focus on developing effective strategies to address the cultural factors of RM issues.

## Acknowledgements

This work was jointly supported by the Ministry of Education in China and Beijing Wanfang Data Co., LTD [grant number: 220905469022130] as well as Peng Feizhang Library Science Development Fund Project of Wuhan University. We would like to thank the editors and anonymous reviewers for their comments and suggestions.

## About the authors

**Wei Feng** is research master student at the School of Information Management, Wuhan University, China. She received her bachelor's degree from Wuhan University and her research interests are in human-AI interaction and research integrity. She can be contacted at [fengwei211@whu.edu.cn](mailto:fengwei211@whu.edu.cn)

**Lihong Zhou** is a professor and the associate dean of the School of Information Management, Wuhan University, China. He obtained his PhD in information studies from the Information School, the University of Sheffield. His research focuses on library services, digital scholarship, and interorganizational information sharing. He can be contacted at [l.zhou@whu.edu.cn](mailto:l.zhou@whu.edu.cn)

**Junmin Xiao** is a lecturer at the School of Chinese Language and Literature, Central China Normal University, China. She obtained her PhD from the School of Education, the University of Sheffield.

Her research focuses on language education and emergency language. She can be contacted at cathyxiaojm2019@163.com.

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