

Fundamental problems in the peer-review process and stakeholders' perceptions of potential suggestions for improvement

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Abstract: Academic papers are essential for researchers to communicate their work to their peers and industry experts. Quality research is published in prestigious scientific journals, and is considered as part of the hiring and promotion criteria at leading universities. Scientific journals conduct impartial and anonymous peer reviews of submitted manuscripts; however, individuals involved in this process may encounter issues related to the duration, impartiality, and transparency of these reviews. To explore these concerns, we created a questionnaire based on a comprehensive review of related literature and expert opinions, which was distributed to all stakeholders (authors, reviewers, and editors) who participated in the peer-review process from a variety of countries and disciplines. Their opinions on the primary issues during the process and suggestions for improvement were collected. The data were then analysed based on various groups, such as gender, country of residence, and contribution type, using appropriate multivariate statistical techniques to determine the perceptions and experiences of participants in the peer-review process. The results showed that unethical behaviour was not uncommon and that editors and experienced reviewers encountered it more frequently. Women and academics from Türkiye were more likely to experience ethical violations and perceived them as more ethically severe. Incentives and stakeholder involvement were seen as ways to enhance the quality and impartiality of peer review. The scale developed can serve as a useful tool for addressing difficulties in the peer-review process and improving its effectiveness and performance.

Keywords: factor analysis, improvement areas, misconduct, peer review, review process, scientific journals, survey data

INTRODUCTION

The volume of articles submitted for publication in scientific journals has increased significantly in recent decades, primarily due to the increase in the number of researchers and intensifying pressures related to career advancement and intense competition for employment opportunities. For instance, an analysis of Elsevier's 2022 performance (Elsevier | An Information Analytics Business, 2023), a key player in academic research and publishing with products such as Scopus, ScienceDirect, and Mendeley, revealed that only 600 thousand out of almost 2.7 million articles submitted to its over 2800 journals were published (Elsevier in Numbers: Surprising Facts from 2022, 2022). Scientific journals not only publish articles authored and prepared by researchers but also subject them to peer review within the same field. Peer review is widely acknowledged as crucial to advancing scientific discourse, involving colleagues who assess the validity, significance, and originality of submissions (Arumugam et al., 2020; Horta & Jung, 2024). Reviewers act as gatekeepers of scientific publishing, providing essential quality assessments by identifying inconsistencies, inadequate methodologies, or overly general writing, thereby guiding editors' decisions (Székely et al., 2014). Beyond evaluation, reviewers should also guide and inspire authors to enhance their papers, ensuring they make a meaningful contribution. However, reviewers typically develop their skills through practical experience, as there is no established formal training for them (Chong, 2021; Otero et al., 2022).

The efficiency of the peer-review process depends on impartial, skilled reviewers who act ethically to assess research (Bailey et al., 2012). Publication ethics guidelines and policies may play an essential role in establishing a transparent procedure that prevents unethical research practices, instances of publication misconduct, manipulation of research communication aimed at practitioners, and the erosion of public trust in academic research (Green & Johnston, 2022).

By participating in the journal peer-review process, reviewers may stay up-to-date with the latest research trends and developments in their field, improve their research abilities by offering them insights into their writing techniques, and enhance their reputation and visibility in the scientific community (Carr & Voordeckers, 2015). Research conducted by IOP Publishing suggests that reviewers are primarily motivated by their interest in the paper, the reputation of the journal, their engagement with the scholar community, and the reciprocation of peer reviews received (IOP Publishing, 2024).

Reviewers may find the time and effort required to complete a review to be excessive (Moizer, 2009), and some reviewers find the process overwhelming (IOP Publishing, 2024). Yet, they are generally not financially compensated. Reviewers must offer knowledgeable assessments, which can sometimes pose difficulties, especially when they do not decline to review a manuscript that is not directly related to their area of expertise. Assessment during reviews is subjective, and the personal biases or viewpoints of reviewers can impact their evaluations.

Key points

- A questionnaire with 50 items was created and distributed to all parties (authors, reviewers, and editors) who participated in the peer-review process, and suggestions were given to improve this process.
- Data from 205 respondents with experience in publishing and reviewing papers were analysed using factor analysis and ANOVA.
- The results revealed that women, academicians from Türkiye, editors, and experienced reviewers may be more likely to experience misconduct in peer-review processes, and they view misconduct as more serious.
- Participants from Türkiye and those with higher academic ranks emphasize the need for incentives and the involvement of multiple parties to improve peer review.

According to Moizer (2009), reviewers may place excessive emphasis on technical excellence as opposed to a manuscript's fundamental contribution to the field. Mandviwalla et al. (2008) asserted that authors may be concerned about the perceived lack of transparency and accountability, feel that the peer-review process does not contribute significantly to their research, and believe that reviewers may privilege particular groups. In a more recent study, while acknowledging the peer-review process as a valuable means to enhance their authorship skills, a substantial number of early career researchers criticized it for being lengthy and prone to receiving superficial or uninformed reviewer comments (Jamali et al., 2020). On the other hand, reviewers experience the burden of producing highly comprehensive developmental reviews for submissions originating from a progressively broader array of research methodologies (Mandviwalla et al., 2008). They also wonder about the value they receive from the peer-review process and feel underappreciated. Some editors are primarily worried about the scarcity of qualified reviewers, the responsiveness of potential reviewers, the necessity to maintain uniformity across reviews to prevent issues of disagreement, and their reputation (Mandviwalla et al., 2008). The decreased willingness of reviewers to perform peer reviews and the difficulties in finding qualified reviewers were emphasized in Grossman (2014). The author also pointed out the absence of incentives for reviewers, the escalating quantity of manuscripts submitted to journals that would worsen the situation, and the discouraging effects of negative institutional policies that would diminish motivations for engagement in the editorial process as additional challenges that could emerge within the peer-review process.

Some research has been conducted to improve the efficiency of the peer-review process. To improve peer-review standards, Allen et al. (2019) analysed best practices in the literature and held meetings with Wiley colleagues. They identified five key

principles: (1) ensuring reliable and potentially reproducible work (content integrity); (2) upholding ethical guidelines (content ethics); (3) fostering an objective and impartial process (fairness); (4) delivering constructive feedback with practical value (usefulness); and (5) maintaining efficient turnaround times (timeliness). They have built on these principles to develop specific recommendations for improving peer review.

According to IOP Publishing's Peer Review Survey Insights, several ways to improve the peer-review process may be suggested: (1) matching reviewers to the right paper based on their expertise; (2) providing reviewers with feedback on their reviews; (3) addressing reviewer workload by streamlining the review process; and (4) improving reviewer experience by providing them with access to referenced papers and clear guidelines (IOP Publishing, 2024).

Székely et al. (2014) suggested the implementation of a quality control mechanism to evaluate the review process of each journal and the generation of a review quality index. They presented four strategies to minimize errors in the review process, which is a critical aspect of scientific decision-making: (1) journals could opt to randomly choose a subset of submitted manuscripts and upload these papers alongside the reviewers' comments and the editorial verdict (accept or reject) onto an accessible repository; (2) in conjunction with their decision notifications, journal editors could provide a hyperlink to an online survey where authors can assess reviewers' statements about accuracy, impartiality, and equity; (3) the editorial board of each journal could appoint an external group of experienced experts to assess a random sample of review remarks from both accepted and declined manuscripts in an anonymous manner; and (4) journals could furnish information about the articles that were submitted to but not accepted by a journal to an external web repository that could then follow the outcomes of these rejected manuscripts, observing whether they are later published by another journal.

Protasiewicz et al. (2016) formulated the structure of a content-based recommender system that facilitated comprehensive information retrieval and established a robust framework for ranking potential reviewers. Cornelius (2012) pinpointed possible causes of delays in the peer-review process by analysing the review procedures to identify and suggest effective approaches to reduce the time spent on reviews, all while upholding the quality standards of the journal. According to the results of this study, effective communication both before and throughout the review process is significant: reviewers should receive comprehensive instructions regarding their responsibilities and anticipated contributions (Cornelius, 2012).

Kousha and Thelwall (2023) recently published a study investigating the role of AI in proficiently aiding in tasks such as finding appropriate journals for paper submission, appraising the initial quality of a paper for pre-screening, identifying suitable reviewers, and evaluating review reports, emphasizing that despite all these contributions, it is currently inadequate for covering the review of an article. According to Checco et al. (2021), AI tools can act as a first reader, filtering out low-quality submissions before they reach human reviewers. This saves reviewers

valuable time by prioritizing papers with greater potential and flagging those that might need extra attention. While AI can streamline workflows by reducing redundant reviews and administrative tasks, ethical considerations such as algorithm opacity, potential biases, and challenges to reviewer autonomy must be carefully addressed. Mrowinski et al. (2017) discussed how AI, specifically evolutionary computation, can support journal editors in the peer-review process by reducing the duration of the process without increasing the reviewer workload. Cartesian Genetic Programming, a nature-inspired evolutionary algorithm, was proposed to improve editorial strategies and reduce the duration of the peer-review process.

Several studies have been carried out to reveal the perceptions of scholars regarding the peer-review process. As mentioned above, IOP Publishing conducted a peer-review survey involving 1200 researchers who had either conducted reviews or been invited to review for an IOP Publishing journal between January 2018 and March 2020 to shed light on the motivations of researchers for reviewing papers and discussed the challenges associated with finding and retaining reviewers (IOP Publishing, 2024). Many reviewers said they were motivated by their interest in the paper and the reputation of the journal. Feedback was expressed as an important factor in the peer-review process. Some reviewers found the process to be overloaded or biased. Adapting a questionnaire from the examinations of the peer-review process in accounting and finance journals, Bailey et al. (2012) conducted a survey to understand how 653 marketing academicians assess the process concerning perceptions of fairness, timeliness, anonymity, improvement of the quality of the research, and prevalence and seriousness of the ethicality of process behaviours. The respondents expressed dissatisfaction with the lack of timeliness in the review process. Zaharie and Seeber (2018) explored how effective a common nonmonetary incentive utilized by journals—publishing reviewer names every year—is in boosting researchers' motivation to act as peer reviewers. They analysed three categories of rewards based on engagement, task completion, and performance. Through a natural experiment involving 1865 participants from business and economics faculties in Romanian universities, they evaluated how these incentives affected scientists based on factors such as gender, rank, research output, and institutional association. The findings demonstrate that performance-based rewards led to a 60% reduction in potential reviewers, especially among male and research-active scientists. Moreover, individuals affiliated with private universities strongly resisted this form of incentive. In conclusion, nonmonetary motivators, potentially dissuading enthusiastic and proficient reviewers, may not always yield positive results. Mustaine and Tewksbury (2008) conducted a survey with criminal justice journal scholars regarding their roles as reviewers for scholarly journal manuscripts. Overall, their findings indicate that reviewers anticipated engaging in reviews, considered it a professional duty, and derived satisfaction from the reviewing process. A substantial portion of the reviewers regarded the peer-review system as fair. Respondents with higher academic ranks and a greater frequency of publication tended to

undertake a greater number of reviews. Nevertheless, most reviewers did not receive formal recognition from their institutions for conducting reviews, even though many asserted that reviewing contributed significantly to their research endeavours. Severin and Chataway (2021) examined the perspectives of various participants in scholarly publishing through a qualitative study and focused on their experiences and beliefs surrounding the peer-review process. The authors asserted that stakeholders involved in peer review had diverse goals. Early- and mid-career researchers valued the social aspects and feedback for developing their work. Both they and the editors saw peer review as a way to make decisions through technical evaluation. However, publishers focused on the suitability of the journal and granting a mark of quality throughout the process.

The peer-review process, a cornerstone of scholarly publishing, faces ongoing challenges in the face of a rapidly growing number of research submissions. While it remains vital for ensuring the quality and integrity of academic research, its limitations are becoming more apparent. As highlighted in this review, concerns about bias, transparency, and reviewer workload necessitate exploring alternative and improved models. A review of the related literature revealed that the academic community has specific expectations of the peer-review process, such as transparency and anonymity. In addition, the process should be managed in a more organized and consistent way so that reviews can be completed in a timely manner. Various strategies, such as using nonmonetary motivators or holding editors accountable for any misconduct that might arise in the process, were even discussed. As a contribution to previous research, the present study provides a panoramic view of the perceptions of scholars, motivations of reviewers, and challenges associated with the peer-review process and offers suggestions that may apply to various research fields for improvement. By offering suggestions that may apply to various research fields, this work contributes to the ongoing conversation about improving this vital system.

The remainder of the paper is organized as follows: Section 2 describes the questionnaire constructed for this purpose. Section 3 presents the details of the survey data and examines the related findings. Section 4 discusses the practical implications of these findings, the limitations of the study, and possible avenues for future research.

RESEARCH DESIGN

Maintaining a transparent and ethical system for conducting peer review is crucial for ensuring the quality and integrity of research output. There are various and multilayered concerns surrounding the peer-review process. Drawing upon the related literature and conducting semi-structured interviews with several experts, a questionnaire of preliminary items was prepared. These items were refined after conducting a pilot study with 33 respondents. Finally, a total of 50 items were adopted and presented in several sections separately. The data analysis consisted of comprehensive data screening, data summarization, and exploratory factor

analysis, which were performed on two sets of items using unweighted least squares extraction with orthogonal rotation, independent sample *t*-tests and analysis of variance. The internal consistency of the questionnaire items was evaluated using Cronbach's alpha. Statistical significance was mostly set at $\alpha = 0.05$, and IBM SPSS Statistics 26 was used throughout the study.

Survey design

An online questionnaire (presented in Appendix A in Supporting Information) consisting of five sections was designed using Google Forms to examine the perceptions of authors, reviewers, and editors on peer-review processes administered by scientific journals, unveil the related problems, and offer suggestions that can improve the most prominent problems encountered during these processes. The first section consisted of five questions to understand the total experience, research areas, and contribution types of participants to the scientific journals. In the second section, the participants were asked to assess the review quality through four questions about the journals to which they submitted their papers. In the third and fourth sections, participants were asked to rate both the prevalence and severity of the items, respectively, using a 5-point Likert scale (ranging from 1 = 'Very rare' to 5 = 'Very common' for the prevalence items; from 1 = 'Trivial' to 5 = 'Severe' for severity items). There was also one open-ended question to collect other possible misconducts that were not among the ones we considered. Similarly, participants were asked to rate to what extent they would agree with each of the 14 suggestions that may improve the journal peer-review process using a 5-point Likert scale (ranging from 1 = 'Strongly disagree' to 5 = 'Strongly agree'). Another open-ended question was asked to collect other potential suggestions to improve the quality or integrity of the peer-review process. Finally, in addition to four general questions to reveal the respondent profile, four questions that were specific to academic participants and two questions that were specific to non-academic participants were asked: how many papers they have been published and reviewed in peer-reviewed journals in the last 5 years; their major publication and research areas; and a set of demographic characteristics (gender, country of origin, country of residence or work, current job title, academic status, type of institution, years of experience since their PhD degree, total years of experience, education status, etc.).

Data collection

Before the questionnaire was distributed, a pilot study was conducted with the participation of 33 academics to check the clarity and scope of the questions. The participants offered two misconducts and four suggestions to be included in the questionnaire. Additionally, they indicated both the degrees of the prevalence and severity of the newly proposed misconduct and the level of agreement for the suggestions offered. After a few revisions in the wording of misconduct and suggestions, the questionnaire

was distributed to academics globally through social networking sites (e.g., LinkedIn), as well as by directly contacting universities, requesting them to share the questionnaire via their communication platforms. Despite being few in number, there were also non-academics that were employed in private industry who made contributions to scientific journals as authors.

The present study poses the following research questions:

RQ1: What are the primary misconduct behaviours that researchers encounter during the peer-review process?

- How frequently are these behaviours experienced?
- How ethically severe are these behaviours perceived?
- Does exposure to these behaviours differ among different groups (e.g., gender, type of contribution, country of residence/origin, type of institution employed, number of papers reviewed/published, academic ranking)?

RQ2: What can be done to improve the peer-review process?

- Are the potential suggestions perceived differently among different groups (e.g., gender, type of contribution, country of residence/origin, type of institution employed, number of papers reviewed/published, academic ranking)?

RESULTS

Profile of the respondents

There were 205 respondents whose characteristics are summarized in Tables 1 and 2. More than half of them had reviewed

at least one paper, and only 4.88% of them neither had an editorial position nor reviewed a paper. The share of students, researchers, and non-academic participants is quite low, considering that 89.27% of them held either full- or part-time academic positions. To observe the degree of engagement of respondents in the peer-review process, we asked about the number of papers they published and the number of reviews they performed. A total of 78.05% of the respondents reviewed more than five papers, and 61.95% published more than five papers in the last 5 years. The average number of years of experience after the academics received their PhD was 12.86, and the average number of years of experience in academic life was 18.61. For non-academic participants, the average number of years of experience in professional life was 14.17. A total of 57.81% of the academics were either professors or associate professors, and 66.15% held positions in public universities or colleges.

Summary of responses

The overall quality of the peer-review process was measured using the four questions Bailey et al. (2012) designed to examine the review process in marketing, accounting, and finance journals. In Table 3, the means and medians of the responses are provided. The participants did not agree on the timeliness of the review process. However, the majority indicated that the peer-review process improved the quality of their research.

Additional details on the respondents' profiles are provided in Supporting Information: Tables B1 and B2 in Appendix B.

TABLE 1 General profile of the participants.

Category	#	%	Category	#	%
Type of contribution			# of Reviews in the last 5 years		
Editor	85	41.46%	None	10	4.88%
Reviewer	110	53.66%	1–5	35	17.07%
Author	10	4.88%	6–10	35	17.07%
			11–15	32	15.61%
			>15	93	45.37%
Gender					
Female	71	34.63%			
Male	125	60.98%			
Prefer not to answer	9	4.39%			
Current job title			# of Papers in the last 5 years		
Academic (full time)	176	85.85%	None	1	0.49%
Academic (part time)	7	3.41%	1–5	77	37.56%
Student	7	3.41%	6–10	64	31.22%
Non-academic	6	2.93%	11–15	29	14.15%
Researcher in a research institute, agency, or centre	9	4.39%	>15	34	16.59%

TABLE 2 Profile of the participants who are academicians.

Category Academic status	#	%	Category Type of institution	#	%
Professor	60	31.25	Public (state) university/college	127	66.15
Professor, Emeritus	5	2.60	Private for-profit university/college	17	8.85
Associate Professor	46	23.96	Private non-profit university/college	45	23.44
Academic Dr./Instructor	9	4.69	Research institute, agency, or centre	3	1.56
Assistant Professor	46	23.96			
Research/Teaching Assistant	17	8.85			
Postdoctoral Researcher	8	4.17			
Researcher, PhD	1	0.52			

TABLE 3 The perceived overall quality of the peer-review process.

Q	The overall quality of the peer-review process	#	Missing	Mean	Median
Q1	The peer-review process generally improved the quality of my research	205	-	3.93	4.00
Q2	The peer-review process was generally fair/unbiased	204	1	3.29	3.00
Q3	The peer-review process was generally timely	204	1	3.03	3.00
Q4	The peer-review process was generally truly anonymous	203	2	3.33	4.00

Data analysis

Regarding data screening, we first conducted a missing value analysis considering only those variables that will be used in factor analysis since missingness could be a serious problem when working with a moderately sized dataset, as in our case. At least 5% of the data were missing for 15 of the 50 questionnaire items, and 55 cases had at least 5% missing data. Four cases (ID = 13, 69, 95, 189) with missing data for more than 50% of the items were excluded. Since Little's MCAR test was not significant (p -value = 0.388), we concluded that the data were missing completely at random, and the missing values were replaced by the means of the items to which they belonged. In one of the 50 items (SUG01), there were seven observations with a standardized value of -3.38 , which could be an indication of an outlier since it is greater than 3.29 in absolute value. These observations were not removed from the analysis since the deviation from the critical value was not substantial. However, one observation (ID = 43) was deleted since its Mahalanobis distance (94.958) was significantly greater than the Chi-square critical value (86.661) at $\alpha = 0.001$; thus, it was highly likely to be a multivariate outlier. In the subsequent analyses, a total of 200 cases were considered. The characteristics of these cases are summarized in Table 4 below. The nonresponse rate was found to be greater than 10% for seven items (MP04, MP06, MP07, MP09, MP14, MP15, and MP16). Neither the highest nor the lowest category was rated by more than 70% of the respondents for any of the items. Thus, a floor or a ceiling effect should not be speculated; however, approximately 68% of the respondents endorsed the highest category for one of the items (MES04).

Since the items (MP01 through MES18) in the first section (misconducts) measure the same domain from two aspects, we combined each prevalence item (weight = 0.4) with the corresponding severity item (weight = 0.6) and then ran a single factor analysis using the new items instead of running two separate items using the original items given in Table 4. This procedure has two practical advantages: (1) the number of cases per variable increases twice, and (2) the moderate skewness in some of the items improves without reflecting or logarithmically transforming them. The items (SUG01 through SUG14) in the second section (Suggestions) were logarithmically transformed to reduce the moderate skewness in their distributions. The corresponding histograms after transformation did not indicate any serious violation to the normality assumption. Scatterplots of the variables in both sets also verified the presence of pairwise linearity.

Factor analysis

The sample size ($N = 200$) was sufficient for conducting factor analysis on both sets of items (the combination of 'misconducts' items and 'suggestions'). There were at least 11 cases per variable in the first analysis and 14 cases per variable in the second analysis. We first employed principal component analysis (PCA) with varimax rotation separately to determine the possible number of factors and to evaluate limitations. The KMO coefficients were found to be greater than 0.6 (0.910, 0.821) for both, and Bartlett's sphericity tests ($\chi^2_{153} = 1236.7, \chi^2_{91} = 632.4$) were also significant at $\alpha = 0.05$, which altogether shows that the sample was adequate for running factor analysis. Since the sample size is

TABLE 4 Descriptive statistics of the questionnaire items.

Item (reference)	Section	Item code	No. of missing values	Mean \pm SD	Median	No. of cases on the floor	No. of cases at the ceiling
The reviewer is evaluative instead of being developmental (1) (Lepak, 2009)	Prevalence	MP01	4	3.54 \pm 0.92	4.00	3	24
	Severity	MES01	1	3.02 \pm 0.97	3.00	14	9
The reviewer asks authors to cite her/his work (2) (Székely et al., 2014)	Prevalence	MP02	8	2.85 \pm 1.22	3.00	28	19
	Severity	MES02	1	3.75 \pm 1.13	4.00	9	58
The reviewer is rude and discouraging (3) (Protasiewicz et al., 2016)	Prevalence	MP03	4	2.44 \pm 1.02	2.00	39	2
	Severity	MES03	0	3.63 \pm 1.11	4.00	6	52
The reviewer uses the ideas of authors in her/his research unethically (4) (Bailey et al., 2012)	Prevalence	MP04	24	1.83 \pm 0.86	2.00	79	0
	Severity	MES04	0	4.26 \pm 1.25	5.00	12	136
The reviewer reviews a paper that is not related to her/his expertise (5) (Henderson, 2001)	Prevalence	MP05	7	2.81 \pm 1.00	3.00	17	7
	Severity	MES05	1	3.57 \pm 1.07	4.00	7	44
The reviewer reviews a paper not in an objective manner in a conflict-of-interest situation (4) (Bailey et al., 2012)	Prevalence	MP06	25	2.40 \pm 1.00	2.00	39	3
	Severity	MES06	2	4.08 \pm 1.03	4.00	4	85
The reviewer discusses the paper with the authors (4) (Bailey et al., 2012)	Prevalence	MP07	26	2.11 \pm 1.12	2.00	70	1
	Severity	MES07	3	3.21 \pm 1.29	3.00	25	38
The reviewer accepts to review a paper, and then due to lack of time, s/he cannot complete the review (1) (Lepak, 2009)	Prevalence	MP08	6	3.01 \pm 1.20	3.00	25	20
	Severity	MES08	2	3.30 \pm 1.06	3.00	12	20
The editor shares her/his opinion with the reviewer about the quality of the paper before the review (4) (Bailey et al., 2012)	Prevalence	MP09	26	2.20 \pm 1.11	2.00	62	3
	Severity	MES09	3	3.36 \pm 1.21	3.00	15	41
The editor assigns a reviewer to a paper that is not related to her/his expertise (6) (Experts)	Prevalence	MP10	6	2.68 \pm 1.06	3.00	25	6
	Severity	MES10	3	3.61 \pm 1.06	4.00	8	43
The editor favours the authors s/he knows in making acceptance decisions (4) (Bailey et al., 2012)	Prevalence	MP11	20	2.88 \pm 1.11	3.00	23	10
	Severity	MES11	5	4.07 \pm 1.13	4.00	7	91
The editor publishes a paper of the authors even if they have not addressed many of the concerns raised by the reviewers (4) (Bailey et al., 2012)	Prevalence	MP12	13	2.12 \pm 0.89	2.00	55	0
	Severity	MES12	4	3.60 \pm 1.07	4.00	9	38
The editor allows a slow reviewer to hold up the review process for an unreasonable period of time (4) (Bailey et al., 2012)	Prevalence	MP13	4	3.08 \pm 1.15	3.00	20	18
	Severity	MES13	4	3.48 \pm 1.11	3.00	8	41
The editor succumbs to pressure from a prominent author to accept a paper despite unfavourable reviews (4) (Bailey et al., 2012)	Prevalence	MP14	33	2.45 \pm 1.05	2.00	35	3
	Severity	MES14	5	4.12 \pm 1.09	4.00	7	94
The editor gives the reviewer authorization to review the paper even if the reviewer alerts the editor that s/he knows the authors (4) (Bailey et al., 2012)	Prevalence	MP15	35	2.30 \pm 1.06	2.00	51	1
	Severity	MES15	4	3.52 \pm 1.15	4.00	11	42

TABLE 4 Continued

Item (reference)	Section	Item code	No. of missing values	Mean \pm SD	Median	No. of cases on the floor	No. of cases at the ceiling
The editor asks the authors to cite her/his work (7) (Green & Johnston, 2022)	Prevalence	MP16	30	1.91 \pm 1.09	2.00	81	5
	Severity	MES16	3	3.84 \pm 1.25	4.00	15	78
The authors of a paper, to get an acceptance, revise a part of their paper even if they do not share the reviewers' views (6) (Experts)	Prevalence	MP17	14	3.34 \pm 1.31	3.00	24	42
	Severity	MES17	2	3.23 \pm 1.14	3.00	19	25
The authors of a paper remove anonymity by citing their work more than necessary or by cluing at the acknowledgment part, and so forth (4) (Bailey et al., 2012)	Prevalence	MP18	15	2.89 \pm 1.12	3.00	26	9
	Severity	MES18	2	3.22 \pm 1.09	3.00	12	27
Allowing the editors to assess the performance of the reviewers (Kriegeskorte et al., 2012)	Suggestions	SUG01	8	3.98 \pm 0.89	4.00	7	45
Allowing the reviewers to assess the performance of the other reviewers (Kriegeskorte et al., 2012)	Suggestions	SUG02	4	3.31 \pm 1.23	4.00	22	30
Allowing the authors to assess the performance of the reviewers (Kriegeskorte et al., 2012)	Suggestions	SUG03	4	3.75 \pm 1.23	4.00	18	57
Requesting voluntary peers to assess the performance of the reviewers (Kriegeskorte et al., 2012)	Suggestions	SUG04	9	3.55 \pm 1.10	4.00	11	36
Building an online external panel of senior experts to assess the review statements (Kriegeskorte et al., 2012)	Suggestions	SUG05	6	3.54 \pm 1.11	4.00	10	40
Building a reviewer board and having each member review a certain number of papers	Suggestions	SUG06	4	3.60 \pm 1.09	4.00	10	38
Revealing reviewers' names to all parties, either during or after the review process (Waltman et al., 2023)	Suggestions	SUG07	4	2.31 \pm 1.29	2.00	73	12
Establishing a communication platform between the authors and the reviewers (concealing their identity) during the review process	Suggestions	SUG08	4	3.30 \pm 1.28	4.00	24	37
Making the authors anonymous to the editors as well	Suggestions	SUG09	6	3.54 \pm 1.27	4.00	20	50
Providing an AI-based pre-assessment system to eliminate the submitted papers that do not meet the journal's major requirements (Calamur & Ghosh, 2024; Kousha & Thelwall, 2023)	Suggestions	SUG10	19	3.26 \pm 1.36	4.00	32	33
Providing the reviewers free access to the journal	Suggestions	SUG11	4	3.69 \pm 1.14	4.00	14	53
Making reviewing a part of academic promotion	Suggestions	SUG12	4	3.79 \pm 1.20	4.00	17	64

TABLE 4 Continued

Item (reference)	Section	Item code	No. of missing values	Mean \pm SD	Median	No. of cases on the floor	No. of cases at the ceiling
Providing recognition incentives (e.g., certificate of outstanding reviewing) to the reviewers by the publisher (Mulligan et al., 2013; Waltman et al., 2023)	Suggestions	SUG13	17	3.96 \pm 1.03	4.00	6	61
Providing monetary incentives to the reviewers by the publisher (Mulligan et al., 2013; Waltman et al., 2023)	Suggestions	SUG14	6	3.26 \pm 1.47	4.00	38	51

moderate, we relied on Bartlett's test of sphericity, which is recommended if there are five cases per variable. In both cases, this test was found to be significant, indicating that the correlation matrix was not an identity matrix. Both correlation matrices were factorable since they contained a sufficient number of correlations greater than 0.30: 126 of the 153 correlations between the first set of items and 19 of the 91 correlations between the second set of items. For the first item set, non-rotated PCA revealed that the smallest eigenvalue was 0.219, which is sufficiently distant from 0; the largest communality value was 0.738, which is sufficiently distant from 1. For the second item set, these values were 0.349 and 0.749, respectively. Thus, the dataset does not suffer from multicollinearity. The scree plots and eigenvalues suggested a three-factor solution for the first item set and a four-factor solution for the second item set.

Next, we conducted several analyses with four to six factors alternating between orthogonal and oblique rotations. We also experimented with different extraction methods, such as principal axis factoring, maximum likelihood estimation, and unweighted least squares (UWLS). UWLS extraction with varimax rotation was eventually chosen, and the optimal number of factors was specified as three and four for the first and second item sets, respectively. The UWLS, which aims to minimize the squared residual correlations (Tabachnick & Fidell, 2019), has been reported to be a feasible choice for exploratory factor analysis when the sample size is small (Jung et al., 2020). This approach is recommended, especially if the number of expected factors is small (Jung, 2013). When UWLS extraction with non-orthogonal rotation was requested for the first item set, only one-third of the correlations among the three factors were found to be slightly greater than 0.60. In the second analysis, there were three correlations among the four factors that were greater than 0.32 in absolute value; however, all these correlations were less than 0.50. Since the factor scores were to be used in subsequent analyses to determine how they would differ among the demographic variables that were considered in the present study, we adhered to the orthogonal factor structure.

For the first item set, three factors were extracted, accounting for 50.16% of the shared variance. This is slightly smaller than the practical threshold of 60%; however, each factor explains more than 10% of the variance, which is not remarkable but

adequate. The squared multiple correlations of the variables with the factors ranged between 0.41 and 0.49. Three items were found to have communality values smaller than 0.40: PSCOMB01, PSCOMB07, and PSCOMB09. Among these, PSCOMB07 explained less than 26% of the variance. However, since all these communality values are greater than the practical threshold of 0.2, there should be no concern about including any of the corresponding items. When the cutoff for inclusion of an item in the interpretation of a factor was set at 0.32, following Pituch and Stevens (2016), most of the items were found to load only on a single factor. PSCOMB03, PSCOMB05, PSCOMB10, and PSCOMB16 were loaded on two factors, each having a 10%–20% variance overlap with the corresponding factor. Even though they loaded on a single factor, less than 20% variance was found between PSCOMB02, PSCOMB07, PSCOMB09, and the corresponding factors. The Cronbach's alphas were all greater than the practical threshold of 0.70, and none of them increased when a related item was deleted. All related results are given in Table 5. The factors were named as follows: Factor 1—Unethical Behaviour, Factor 2—Misbehaviour, and Factor 3—Violating the Anonymity of the Review Process.

Thirty-six (23%) of the values in the residual correlation matrix were greater than 0.05 in absolute value. Since this might be a possible indication of an additional factor, we alternated between four to six factors using the same type of extraction and rotation; however, the findings indicated no substantial improvement compared with the three-factor solution. In sum, this appears to be a fair design considering the moderate sample size, and the variables appear to be defined better by this factor solution than they define the factors.

For the second item set, four factors were extracted. All related results are given in Table 6. The percentage of the shared variance explained (43.1%) was again lower than the practical threshold. Each of the factors accounts for between 6.8% and 15.7% of the variance, which is not a remarkable performance. The squared multiple correlations of the variables with the factors ranged between 0.33 and 0.60. All the communality values were greater than the practical threshold; however, LOGSUGG08, LOGSUGG09, and LOGSUGG10 could explain less than 30% of the shared variance. Based on a cutoff of 0.32, all items loaded on at least one factor; however, the items

TABLE 5 Rotated factor loadings, communalities, and percents of variance and covariance for the first item set (UWLS Extraction, Varimax Rotation), internal consistency.

Item	Loadings			Communalities	α	α if item deleted
	Factor 1	Factor 2	Factor 3			
PSCOMB04	0.834			0.748	0.907	0.887
PSCOMB14	0.664			0.624		0.890
PSCOMB06	0.590			0.560		0.895
PSCOMB15	0.564			0.469		0.900
PSCOMB16	0.546		0.437	0.578		0.892
PSCOMB11	0.542			0.514		0.898
PSCOMB12	0.522			0.461		0.899
PSCOMB02	0.417			0.461		0.902
PSCOMB05	0.417	0.678		0.641	0.845	0.808
PSCOMB10	0.426	0.661		0.654		0.804
PSCOMB08		0.609		0.438		0.822
PSCOMB13		0.553		0.456		0.812
PSCOMB01		0.505		0.305		0.845
PSCOMB03	0.401	0.480		0.439		0.825
PSCOMB18			0.700	0.598	0.752	0.647
PSCOMB17			0.604	0.504		0.672
PSCOMB09			0.421	0.325		0.734
PSCOMB07			0.406	0.255		0.718
Sum of squared loadings	3.653	2.937	2.442			
Perc. of variance	20.3%	16.3%	13.6%			
Perc. of covariance	40.4%	32.5%	27.0%			

mentioned above had less than 20% overlap variance with their factors. In addition, LOGSUGG10 loaded on more than one factor. Thus, this item should be interpreted with caution. On the positive side, this run produced only six (6%) non-redundant residuals. This finding is substantially better than the corresponding finding in the previous analysis. Thus, there appears to be no need for an additional factor. Only the first and second scales had a Cronbach's alpha greater than the practical threshold of 0.70. In addition, removing LOGSUGG05 increased the Cronbach's alpha of the second scale. This is not a weak design considering the clear factor structure produced; however, it should be replicated using a larger sample since some of the items seem slightly problematic. Nevertheless, the second set of factors was named as follows: Factor 1—Incentives, Factor 2—Collaboration, Factor 3—Involvement in Performance Assessment, and Factor 4—Impartiality.

Group differences

Once the factors were identified, an independent samples *t*-test or a one-way ANOVA procedure was employed for each factor

separately in both analyses to compare the mean factor scores across the categorical indicators we included to characterize the population. For each binary indicator, the results indicated that group variances could be assumed to be equal for each factor in both analyses at $\alpha=0.05$. Regarding GENDER, a significant difference was found between men and women in the mean scores of the third factor in the first analysis ($t_{189} = -2.434, p < 0.02$). The average factor score for women ($n=69$) was found to be 0.31 greater than that for men ($n=122$) in this case. Thus, women appearing to be more likely than men to have experienced actions violating the anonymity of the review processes and/or to regard such misconduct as ethically severe than men. Consequently, the degrees of freedom used for GENDER differ from those utilized in the future. The binary variable CONTRIBUTION was formed to distinguish between editors ($n=82$) and authors/reviewers ($n=118$). Participants with editorial experience, in addition to their roles as reviewers and authors, were categorized as editors, whereas reviewers and authors were grouped together. A significant difference was found between these two groups at $\alpha=0.05$ in the mean scores of the first factor in the first analysis ($t_{198} = -2.191, p < 0.04$). The mean

TABLE 6 Rotated factor loadings, communalities, and percents of variance and covariance for the second item set (Logarithmic Transformation, UWLS Extraction, Orthogonal Rotation), internal consistency.

Item	Loadings				Communalities	α	α if item deleted
	Factor 1	Factor 2	Factor 3	Factor 4			
LOGSUGG13	0.767				0.622	0.818	0.807
LOGSUGG12	0.707				0.531		0.779
LOGSUGG14	0.617				0.451		0.765
LOGSUGG11	0.563				0.403		0.751
LOGSUGG10	0.355			0.352	0.269		0.802
LOGSUGG05		0.838			0.749	0.752	0.798
LOGSUGG06		0.525			0.376		0.614
LOGSUGG04		0.511	0.377		0.452		0.556
LOGSUGG02			0.610		0.549	0.535	0.485
LOGSUGG03			0.601		0.479		0.343
LOGSUGG01			0.474		0.300		0.460
LOGSUGG07				0.520	0.404	0.494	0.335
LOGSUGG08				0.435	0.219		0.487
LOGSUGG09				0.345	0.227		0.329
Sum of squared loadings	2.200	1.509	1.369	0.952			
Perc. of variance	15.7%	10.8%	9.8%	6.8%			
Perc. of covariance	36.5%	25.0%	22.7%	15.8%			

scores of the fourth factor in the second analysis were also found to differ between them ($t_{198} = -2.989, p < 0.005$). Authors/Reviewers were thus found to be less likely to have experienced actions violating the anonymity of the review processes and/or to regard such misconduct as ethically severe compared to Editors. They also appear to be less likely to support the actions suggested to improve impartiality during review processes. Significant differences in the mean scores of the third factor in the first analysis ($t_{198} = -2.683, p < 0.01$) and the third factor in the second analysis ($t_{198} = 2.343, p < 0.03$) were found between those from Türkiye ($n = 142$) and the others ($n = 58$). This inference, however, can be repeated only for the first factor in the second analysis at $\alpha = 0.10$ ($t_{198} = 1.700$) for the case when participants are grouped based on whether they reside/work in Türkiye ($n = 134$) or not ($n = 66$). Participants from Türkiye appear to be more likely to have experienced actions violating the anonymity of the review processes and/or to regard such misconduct as ethically severe compared to those outside this group; however, on average, they found that suggestions related to the performance assessment of reviewers would be less likely to improve review processes. Participants who reside/work in Türkiye are more likely to think that incentives can indeed improve anonymous review processes. The binary variable INSTITUTION was formed to distinguish between public universities ($n = 124$) and other universities (i.e., private nonprofit universities or colleges, private for-profit universities or colleges, research institutes/agencies/

centres) ($n = 76$). Only at $\alpha = 0.10$ was a significant difference in the mean scores of the fourth factor found between these two groups in the second analysis ($t_{198} = -1.633$). Participants affiliated with a public university were thus more likely to support the actions suggested to improve impartiality during review processes.

The ordinal variable NOR categorizes the current sample based on the number of papers reviewed in peer-reviewed journals in the last 5 years. The NORs of the participants who reviewed fewer than 6 papers were coded as 1 ($n = 43$), those who reviewed more than 15 papers were coded as 3 ($n = 91$), and all others were coded as 2 ($n = 66$). Similarly, the ordinal variable NOP categorizes the current sample based on the number of papers published in peer-reviewed journals in the last 5 years. The NOPs of the participants who published fewer than 6 papers were coded as 1 ($n = 78$), those who published more than 10 were coded as 3 ($n = 61$), and all others were coded as 2 ($n = 61$). The categorical variable ACASTAT, on the other hand, splits the current sample based on academic ranking. The ACASTAT scores of the assistant professors were coded as 1 ($n = 45$), those of the associate professors were coded as 2 ($n = 45$), those of the professors were coded as 3 ($n = 63$), and those of all others were coded as 4 ($n = 47$).

One-way ANOVA results for NOR indicated that the assumption of homogeneity of variances across groups was not violated for any of the factors except for the first factor in the

first analysis (Levene Statistic = 3.777, $p < 0.03$). At $\alpha = 0.05$, the mean of the first factor in the first analysis differed for at least one of the NOR groups ($F_{2,197} = 5.993, p < 0.005$). Tamhane's multiple comparison tests (since group variances cannot be assumed to be equal) suggested that those who reviewed fewer than 6 papers in peer-reviewed journals in the last 5 years had an average 'unethical behavior' score that was 0.56 lower than that of those who reviewed more than 15 papers ($p < 0.01$). Thus, experienced reviewers appearing to be more likely to have experienced unethical behaviour during review processes. One-way ANOVA results for NOP and ACASTAT indicated that the assumption of homogeneity of variances was not violated for any of the factors. At $\alpha = 0.05$, there was insufficient evidence to claim that mean factor scores differed among NOP groups; however, at least one of the ACASTAT groups had different mean scores for the first, third, and fourth factors in the second analysis ($F_{3,196} = 6.068, p < 0.005$; $F_{3,196} = 3.210, p < 0.025$; $F_{3,196} = 4.927, p < 0.005$). Tukey's multiple comparison tests (since group variances can be assumed to be equal) demonstrated that the average 'Incentives' scores, the average 'Involvement in Performance Assessment' scores, and the average 'Impartiality' scores differed significantly between assistant professors and professors ($p < 0.02, p < 0.03, p < 0.03$). For the last factor, the mean scores also differed significantly between assistant professors and associate professors ($p < 0.05$). In all these cases, the mean scores of the assistant professors were lower (by 0.50, 0.42, 0.37, and 0.36, respectively).

DISCUSSION AND CONCLUSION

The importance of preserving the fairness and objectivity of peer review in the world of academic publishing is undisputed. However, misconduct, such as showing favouritism towards particular authors or institutions and disclosing confidential information, is unfortunately not uncommon. These behaviours can compromise the reliability of peer-review processes.

The findings of the present study, which investigates the primary misconduct behaviours that researchers encounter during the peer-review process, indicate that editors (in comparison with authors and reviewers), as well as more experienced reviewers, encounter unethical behaviour more often during the peer-review process. They also consider this misconduct, which could violate the anonymous reviewing process, to be more ethically severe than others. Their heightened awareness of ethical concerns is highly likely to be due to their increased exposure to the peer-review process and the pressure to maintain high standards.

Moreover, female academicians and academicians from Türkiye are found to have a greater likelihood of experiencing actions that could violate anonymous reviews. In addition, these parties perceive such misconduct as more ethically severe compared to those outside their groups. They may be more vulnerable to unethical behaviour during the peer-review process due to power imbalances or cultural norms that prioritize specific voices over others. This may have contributed to their increased

likelihood of experiencing ethical violations and viewing such behaviour as more ethically severe.

Academicians who are currently working/residing in Türkiye and those with higher ranks in academia, such as professors, believe that improving the quality of peer review in journals can be achieved by implementing certain incentives and involving various stakeholders in the assessment process. These two groups place greater emphasis on maintaining high standards of quality and integrity in the peer-review process, leading them to be more attentive to potential ethical violations. This may also explain why they tend to place greater importance on ensuring impartiality during the peer-review process.

Furthermore, compared with individuals outside of these groups, editors, academicians affiliated with a public university, and those with higher academic ranks strongly believe that ensuring impartiality during the peer-review process can enhance the overall quality of peer review. Suggestions such as offering incentives, including various actors in the performance assessment of related parties, or ensuring impartiality during review processes are found to be less likely to improve the quality of the peer-review process of journals by assistant professors than by professors. This, however, only partially corroborates the findings suggesting that early-career researchers place greater value on awards such as peer awards and certificates from the IOP Publishing (2024).

Based on our findings, it is crucial to promote open communication and foster a culture of ethical behaviour within editorial boards to address misconduct. Considering alternative models to review papers, such as anonymous review with post-publication author identification, may also help mitigate bias and improve the impartiality of reviewers. Furthermore, including reviewers from diverse backgrounds and with diverse levels of experience in the review process could enhance the overall quality and fairness of peer review.

Institutions and academic journals should consider providing training sessions or workshops to editors, reviewers, and authors to increase awareness of ethical standards and best practices in peer review. A special focus should be on the significant differences observed between genders and roles (editors vs. authors/reviewers), ensuring that all participants are equipped to handle and report ethical concerns.

Based on the findings that certain groups, such as academics in Türkiye and those with higher academic ranks, believe that incentives could improve peer-review quality, journals may consider implementing incentives such as recognition programmes or financial rewards for reviewers who adhere to ethical standards and contribute to high-quality peer review.

Publishers should implement regular monitoring and evaluation of the peer-review process to detect, address, and prevent unethical behaviours. This could include periodic audits of review processes and feedback mechanisms for participants to report unethical behaviour anonymously.

This study presents the results of a survey that relied on researchers agreeing to participate. This, combined with a large response from Türkiye, may have an influence. The proposed

research methodology can be replicated by expanding the scope of participants, with a special emphasis on increasing geographical diversity. Cultural norms and values may influence perceptions of ethical behaviour and the severity of misconduct. Future research should thus consider examining how cultural factors impact experiences and attitudes towards misconduct in peer reviews. Factors that contribute to different experiences and perspectives in this area should also be fully understood so that potential solutions to address misconduct can be identified. Investigating how reviewers decide to review a journal paper and how authors choose which journal to submit their work to avoid unnecessary editorial workload due to out-scope papers could also be insightful as another possible avenue for future research. The development of a decision model that considers the varying degrees of importance of misconduct would also be beneficial. Such a model could assist decision-makers in determining which recommendations should be implemented first, thereby improving the efficiency of the process.

AUTHOR CONTRIBUTIONS

Cigdem Kadaifci: Conceptualization (equal); methodology (equal); writing – original draft preparation (equal); writing – review and editing (equal); funding acquisition (equal). **Erkan Isikli:** Conceptualization (equal); methodology (equal); writing – original draft preparation (equal); writing – review and editing (equal); funding acquisition (equal). **Y. Ilker Topcu:** Conceptualization (equal); methodology (equal); writing – original draft preparation (equal); writing – review and editing (equal); funding acquisition (equal).

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

ETHICS STATEMENT

The study was approved by the Istanbul Technical University Institutional Review Board in Social Sciences and Humanities (approval code 148), and all procedures performed in this study involving human participants were in line with the 1975 Helsinki Declaration.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Appendix A: Peer-Review Process.

Appendix B: Tables.

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