ORIGINAL ARTICLE

The Association of Learned & Professional Society Publishers

(wileyonlinelibrary.com) doi: 10.1002/leap.1283

Received: 16 October 2019 | Accepted: 10 December 2019

Early career researchers and their authorship and peer review beliefs and practices: An international study

Hamid R. Jamali [1*] David Nicholas [2] Anthony Watkinson [3] Abdullah Abrizah [4] Blanca Rodríguez-Bravo [5] Cherifa Boukacem-Zeghmouri [6] Jie Xu [2] Tatiana Polezhaeva,[7] Eti Herman,[8] and Marzena Świgon [9]

[1]School of Information Studies, Charles Sturt University, Locked Bag 588, Wagga Wagga, NSW, 2678, Australia

[2]School of Information Management, Wuhan University, Wuhan, Hubei, 430072, China

[3]CIBER Research Ltd., Newbury, Berkshire, RG147RU, UK

[4]Department of Library and Information Science, Faculty of Computer Science and Information Technology, University of Malaya, Kuala Lumpur, 50603, Malaysia

[5]Biblioteconomía y Documentación, Universidad de León, León, Castilla y León, 24071, Spain

[6]Department of Computer Science, Université de Lyon, Université Lyon 1, 69100 Villeurbanne, France

[7]Laboratory for Library and Communication Studies, Tomsk, Russia Library for Foreign Literature, Tomsk State University, Moscow, Russia

[8]CIBER Research Ltd., Newbury, Berkshire, RG147RU, UK

[9]Wydział Humanistyczny, Uniwersytet Warminsko-Mazurski, Olsztyn, 10-719, Poland

ORCID:
H. R. Jamali: 0000-0003-1232-6473
D. Nicholas: 0000-0001-8046-2835
A. Watkinson: 0000-0002-2317-6557
A. Abrizah: 0000-0002-8224-5268
B. Rodríguez-Bravo: 0000-0002-9476-7602
C. Boukacem-Zeghmouri: 0000-0002-0201-6159
J. Xu: 0000-0002-9820-8066
M. Świgon: 0000-0003-3600-8349

*Corresponding author: Hamid R. Jamali
E-mail: h.jamali@gmail.com
Tel.: 612 693 32468

Abstract

This article reports on the findings of an international online survey of early career researchers (ECRs) with regard to their authorship and peer review, attitudes, and practices, which sought to discover how the new wave of researchers were utilizing these key aspects of the scholarly communications system. A questionnaire was developed on the back of a 3-year longitudinal, qualitative study and was distributed through publisher lists, social media networks, university networks, and specialist ECR membership organizations. Identical English, Polish, Russian, Chinese, Spanish, and French versions of the questionnaire were used. Results from 1,600 respondents demonstrated that 82.7% had co-authored a paper, and most had performed a variety of authorship tasks. Almost half the respondents reported being subject to various authorship policies, although a quarter said they were not aware of any such policies. Almost all Chinese ECRs reported being subject to authorship policies, but only a third of UK ECRs reported the same. Three-quarters of ECRs had experience in responding to peer review, and half had been peer reviewers. Half the respondents had a good experience of review and viewed it as a valuable way to improve their authorship skills. However, there was some criticism of some shortcoming such as lengthy peer review and superficial or uninformed comments by reviewers. Double-blind review was the preferred methodology, and there were few suggestions for how to improve the review process.

Keywords: early career researchers, scholarly communications, authorship, peer review, reward and recognition

INTRODUCTION

This paper investigates the authorship and peer review attitudes and practices of early career researchers (ECRs) in order to see how the new wave of researchers are dealing with these fundamental aspects of scholarly communications system. These two are connected in that they are part of the same process, one producing content and the other the quality control of what is

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

Key points

- Institutions should increase the awareness of authorship policies and rights among early career researchers (ECRs).
- ECRs benefit from peer review mainly by learning how to improve their own work.
- While ECRs do not see the current peer review system as perfect, they prefer the double-blind peer review to prevent bias.
- Over 90% of Chinese ECRs reported being subject to author policies; this figure was less than a third for the UK.
- Over 40% of ECRs said they were influential in authorship decisions, but fewer women reported having influence than men.

produced, with the same people doing both (Mulligan, Hall, & Raphael, 2013; Nicholas *et al*., 2015). Engaging in these activities for ECRs as 'the most vulnerable group in the science system' (Laudel & Gläser, 2008, p. 388) is an important step in their research careers. It is said that ECRs find the publishing and peer review a complex process, and they learn by engaging in this process (Merga, Mason, & Morris, 2018).

More specifically, the aims of this study are to find out about: (1) ECRs' involvement in the full range of authorship activities; (2) the existence of authorship policies and the influence on authorship decisions; (3) ECRs' engagement in the peer review process as authors and reviewers; (4) what the benefits of peer review for them are and whether they see the process as fair; and (5), their opinion on the various peer review models.

The questionnaire survey reported here builds directly upon the work of the Harbinger longitudinal interview-based study (http://ciber-research.eu/harbingers.html) and informed the construction of the questionnaire. It also builds on, and relates to, the work published in this journal on these two topics (Nicholas *et al*., 2017; Rodríguez-Bravo *et al*., 2017). We wished to disseminate the topics to a larger and more comprehensive population (for instance, the qualitative study was restricted to just seven countries and excluded the arts and humanities).

The qualitative study showed that, despite their juniority, ECRs are in fact productive authors who have a significant influence in choosing a journal to publish their papers (Nicholas *et al*., 2017). The study also showed that many have experience in peer review (in both being reviewed and reviewing the work of others) and consider it a very important process. Although they want some small improvements, they do not want wholesale changes to the current system (Rodríguez-Bravo *et al*., 2017).

While there is a rich body of literature on both peer review and authorship, few past studies have covered ECRs. On authorship, Merga *et al*. (2018), who documented their own experience using an auto-ethnographic approach, is one of the few studies. However, there are general studies on different aspects of authorship such as order of authors (e.g. Dance, 2012), ethical aspects (Kornhaber, McLean, & Baber, 2015), and collaboration (Müller, 2012). Concerning peer review, the survey by Mulligan *et al*. (2013) included a good number of young researchers (assuming they were ECRs), but few age-related analyses were presented. Their study showed that young researchers were more likely to be happy to do reviews in future, and they were more likely to think they would benefit from clearer guidelines, but in terms of satisfaction with peer review, they were not particularly happier than older researchers. This level of satisfaction was similar to the one found in the survey by Research Information Network (2010). Other aspects of peer review, such as bias (Lee, Sugimoto, Zhang, & Cronin, 2013) and reward for reviewers (Warne, 2016), have been covered by research with no reference to ECRs. For reviews of the literature on peer review, see Bohannon (2013), Ford (2013), and Sabaj Meruane, Gonzalez Vergara, and Pina-Stranger (2016).

METHODS

A questionnaire survey (see the questionnaire here: http://ciber-research.eu/download/ECR-questionnaire-for-website-20191129.pdf) was developed after a 3-year longitudinal qualitative study (Nicholas *et al*., 2019), pilot tested, and distributed online via SurveyMonkey and made available in June, 2019. The survey was made available in English, Spanish, French, Chinese, Russian, and Polish in order to increase responses from these core countries. The questionnaire featured a comprehensive range of questions including discovery, metrics, open access, authorship, and peer review, and this paper only focuses on the last two. There is a plan to publish on the other scholarly aspects at a later date, and the underlying data set will also be made available.

Because there was no single sampling frame for ECRs or even a universal definition (the two are related), a broad brush approach to dissemination was adopted with the questionnaire distributed via social media networks, academic publishers (Wiley, Emerald, Cambridge University Press, Public Library of Science), and key ECR networks (Eurodoc, Voice of Young Science). Because of this, the questionnaire began with a screening question to filter out those respondents who did not broadly meet our ECR conditions:

We are most interested in hearing from researchers who are generally not older than 35, who either have received their doctorate and are currently in a research position or have been in research positions but are currently doing a doctorate. In neither case should researchers be in established or tenured position. But if all of that is just too complex if you believe you are an early career researcher that is all that counts!

Overall, 1,600 ECRs completed the questionnaire successfully. Participants included 678 (42.4%) from the English survey, 253 (15.8%) from the Chinese, 236 (14.8%) from the French, 172 (10.8%) from the Polish, 148 (9.3%) from the Russian, and 113 (7.1%) from the Spanish versions. In the English version, 95 respondents were from Malaysia, 84 from the USA, 82 from

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

the UK, 60 from India, and the rest from other countries. From the total responses received, 42.5% were male, and 45.7% were female, and the rest preferred not to say (2%) or did not answer the question (9.9%). Over a third (38.8%) of the respondents were 30 years of age or under, 32.2% were 31–35 years old, 12.9% were above 36–40 years, and 6.2% were 40+ years, and the rest did not answer. Doctoral students accounted for 28.3% of respondents, assistant professors/lecturers and post-doctoral students/researchers each accounted for 16.3% of respondents, and the rest were academic researchers (13.6%) or non-tenure track faculty (3.3%); others (6.7%) or did not say. Half of respondents (51.1% had a PhD and 30.7% had a master's degree, and the rest had either a bachelor's degree (3.4%), a professional degree (3.3%), other degrees (1.8%), or did not say. A third of respondents came from social sciences (33.9%), and the rest belonged to physical sciences and engineering (20.7%), life sciences (16.3%), health sciences (9.7%), and arts and humanities (8.6%). The mean and median of years active as researcher was about 5 years, and on average, they published 2.7 articles in 2018 (*Mdn* = 2).

For ethical reasons, respondents were allowed to skip any question and leave the questionnaire at any point if they wished. As a result, about 10% of respondents skipped some of the demographic questions, and therefore, in the tables below, the number of respondents varies, especially when demographic comparisons are made. Another limitation was that, due to various means of distribution, it is not possible to calculate a response rate. The data are biased towards a few countries that were specifically targeted because those were countries that were included in the qualitative part of the study. In addition, the distribution of the survey by certain publishers (e.g. Emerald) might have contributed to an uneven number of respondents from different subjects (hence, larger number of respondents from social sciences). The analysis below includes frequency, percentage, chi square, and analysis of variance (ANOVA) tests where appropriate. Diverging stack bar was used for Likert data showing percentage and mean value of answers. Closed-ended questions are presented in tables and figures, and open-ended questions were coded and presented in the text of the findings section. Tables for multiple-response questions include percentages of responses and percentages of cases, which is greater than 100 as respondents could choose more than one option. Percentage of responses have been computed by dividing the number of people who selected any option by the number of people who selected one or more options, and percentage of cases has been computed by dividing the number of people who selected any option by the total sample.

FINDINGS

Authorship

We started this part of the survey by asking whether they had published a co-authored paper because of the added complexities and issues involved that comes with collaboration. Of 1,598 respondents, 82.7% (1323) said they had co-authored. Clearly, the vast majority of ECRs have co-authored papers and work in research teams. The rest of the questions in the authorship section relates only to those co-authored. Authorship can involve many different activities, and eight are listed in Table 1. Respondents could choose more than one. These activities are based on what we learned about authorship from the open-ended questions in the interview stage and based on how ECRs defined authorship. All attracted reasonably large number of respondents, showing that, as anticipated, ECRs are multi-taskers (on average, they conducted 4.5 of the activities), the work horses, and are widely involved with the fundamentals of scholarly publishing. Writing papers (83.5%) and analysing the data (82.1%) are the most common activities, showing how embedded and essential ECRs are to the publishing process. What they tend not to be closely involved with is obtaining funds for OA publishing (7.4%), and they probably do not have the seniority or status to perform this increasingly important task. This also explains why, in the interviews and elsewhere in the questionnaire, they complained about article processing charges.

The question had an 'other' option, and 35 ECRs used 'this option to list other forms of contribution: editing, reviewing and proof reading, formatting, visualization of data, project management, helping with revision, and translation.

We now know that ECRs are involved in a wide range of authorship tasks, so they are busy, but are they also influential? It seems they are because only 11% thought they were not, whereas 41% thought they had big influence, and another 48% thought they had some influence (Fig. 1). There are important differences in terms of gender with the proportion of females who said they had no influence (13.6%) being twice that of males (7%) (X^2 = 15.3, p < .005, df = 2). There are also subject differences (Table 2) with ECRs in the life sciences having the lowest percentage of big influence and those in the social sciences having the highest percentage.

The interview study told us that ECRs are potentially subject to a myriad of sometimes changing authorship policies. Thus, we asked ECRs whether they are subject to a 'formal or informal

TABLE 1 What was your contribution to the papers you have co-authored? (Multiple response; $N \approx 1{,}308$).

	N	%	% of cases
Writing the paper	1,092	18.3	83.5
Analysing the data	1,074	18	82.1
Editing the paper	995	16.7	76.1
Reviewing the literature	912	15.3	69.7
Producing or gathering data	868	14.6	66.4
Conducting the fieldwork	679	11.4	51.9
Finding funds for the research	239	4	18.3
Obtaining funds for open access publishing (APC)	97	1.6	7.4
Total	5,956	100	

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

authorship policy, which determines authorship status and order'. This appears to be very much the case with close to half (745, 47.1%) saying they were. A quarter (396, 25%) said they were not, and around another quarter (442, 27.9%) said they did not know. One would expect that the situation with authorship policies to be different in different countries and different subject areas, and this was indeed the case in terms of regions and country (Table 3). Thus, while 91.5% of Chinese and 72.1% of Russians felt they were subject to policies, only 32.1% of UK researchers felt the same. In terms of subject (Table 4), ECRs in the arts and humanities were less likely to be subject to policies than those in the health, life, and social sciences.

These author policies could relate to a number of issues as shown in Table 5. The most common, however, concerned the criteria for establishing who should be the first author (73.7%) and the order in which authors are named (70.3%). There was an 'other' option used by 11 ECRs to mention additional ones: the use of alphabetical order (which is really option 2 in the table); rules for determining the last author; and informal rules, such has whoever does the most will be the first author.

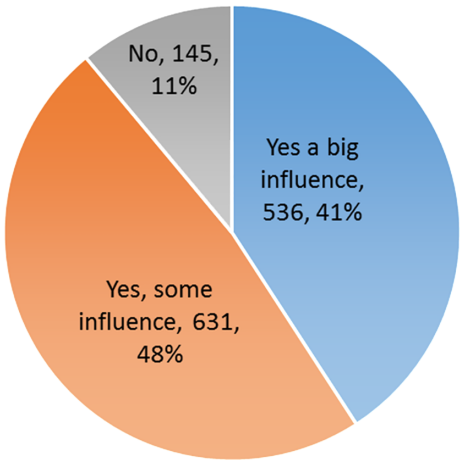

FIGURE 1 Do you feel you have an influence on authorship decisions when you co-author?.

As expected, there were country/regional differences (Table 6). For Chinese ECRs, the criteria for determining who is first author was the main policy to be identified, and our interview data told us that this is because of policies dictated in order to obtain high reputational reward and remuneration. In contrast, in North America, the most reported policy was that of determining who could be named as an author, and in the UK, it was jointly the criteria for determining the order and naming of authors. Subject wise (Table 7), while in the health sciences, the most common policy concerned determining who can be an author, for the social sciences and arts and humanities, it was the determination of who qualified to be first author followed by the order of authors. The fact that Chinese researchers are so heavily mandated and that so many more of them responded to the authorship questions then the overall picture as seen in Table 3 is likely to be skewed towards the Chinese.

Less than half of ECRs responded to the question asking 'Would you do things differently if you were in charge of arrangements?' From those who responded, 41% (305) said they would not, 30.2% (225) said they would, and 28.8% (214) said they did not know. If we add the number of ECRs who did not answer the question to the latter group, then the large majority of ECRs were not in a position to judge.

Those who thought they would do things differently were asked a follow-up question, which asked for the differences they would make. A total of 150 ECRs answered this open-ended question and poured their hearts out. These were people who were unhappy with current practices for a number of reasons. Of the comments, 68 were about unfair practices in decisions taken about

TABLE 2 Influence on authorship decisions by subject.

	Health sciences		Life sciences		Physical science and engineering		Social sciences		Arts and humanities	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Yes, a big influence	48	33.1	70	31.5	115	40.2	224	48.5	38	44.2
Yes, some influence	74	51.0	116	52.3	142	49.7	207	44.8	39	45.3
No	23	15.9	36	16.2	29	10.1	31	6.7	9	10.5
Total	145	100	222	100	286	100	462	100	86	100

N = 1,201; X^2 = 32; df = 8; and p < .005.

TABLE 3 Being subject to authorship policies by region.

	North America		UK		China		Russia		West Europe		Other	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Yes	32	45.7	18	32.1	214	91.5	49	72.1	144	62.6	243	61.4
No	38	54.3	38	67.9	20	8.5	19	27.9	86	37.4	153	38.6
Total	70	100	56	100	234	100	68	100	230	100	396	100

N = 1,054; X^2 = 114; df = 2; and p < .005.

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

TABLE 4 Being subject to authorship policies by subject.

	Health sciences		Life sciences		Physical science and engineering		Social sciences		Arts and humanities	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Yes	83	70.9	129	69.7	173	70.3	258	63.2	48	54.5
No	34	29.1	56	30.3	73	29.7	150	36.8	40	45.5
Total	117	100	185	100	246	100	408	100	88	100

N = 1,044; X^2 = 11; df = 2; and p = .026.

TABLE 5 The main specifications of the policy (multiple answer; $N \approx 735$).

	N	%	% of cases
Criteria for determining who can be named as authors of a paper	474	24.9	64.5
Criteria for determining the order in which authors are named	517	27.2	70.3
Criteria for determining the corresponding author	370	19.4	50.3
Criteria for determining first author	542	28.5	73.7
Total	1903	100	

the order of authors; 16 of them were related to the issue of who should be the first author and 27 to who should be corresponding author. The essence of what they were saying is that it is the amount of the contribution that matters when it comes to order and that the contributions of authors should be clarified. Apparently, the issue is magnified by the fact that some institutions give too much credit to the first and corresponding author. Therefore, some ECRs suggested that being co-first author or co-corresponding author should also be catered for. Twenty-three comments were related to authorship criteria and who gets to be an author. Essentially, they were unhappy that some people (mostly senior researchers) who have done little work have their name on papers as a matter of course. For instance, 'young scientists are dependent on the "graciousness" of the older professors and it usually ends with the young scientist doing the whole job, and the "co-author"-professor, signs it and takes the laurels.' Nine comments were related to student supervisor co-authorships. They suggested that supervisors should be on the papers only if they contribute, and students should be the first and the corresponding author. Four ECRs suggested that the process of deciding about authorship should be more democratic so that researchers involved can have a say. Four asked for acknowledgement of collaboration so that people receive credit for this. One asked for consistency of authorship rules in different fields.

Peer review

This section is both about being reviewed and acting as a reviewer. The first part up to Table 10 is about the experience of ECR with respect to them being reviewed. The rest (Table 11 onward) is about ECRs acting as reviewers. Nearly three-quarters of ECRs (73.3%, 1,155) have had experience being reviewed and having to accommodate the critiques of reviewers for papers they had (co-)authored.

Of those who responded to the follow-up question about how they found the experience, a small majority (51%) thought it to be good, and just less than that (47%) thought it mixed (Fig. 2). The surprise is that only 2% thought it was bad. However, there were some country differences. The Russians were much more likely to say they had a good experience and the North Americans to say it was bad (see Table 8). There was no statistically significant difference in responses between those who have experience of being a reviewer and those who did not.

Those who thought it was a good experience (Table 9) believed this largely because it was a learning experience (84.5%) and helped their writing/presentational skills (78.5%). Of those who thought it bad or mixed (Table 10), the biggest criticisms were the length of time it took (68.1%) and the superficial comments provided by the reviewers.

Of those who thought it was a good experience, 18 mentioned 'other' benefits. Nine of them said, in one way or another, that peer review generally improved their own work. Other benefits mentioned included engaging in scientific dialogue, understanding expectations of reviewers, learning how to defend one's own work, increased confidence about own work, understanding how researchers think differently, understanding cross-analytical skills, and obtaining an insight into the peer review process (e.g. time, language, gaps etc.).

Of those who thought it was a mixed or bad experience, 40 mentioned other shortcomings. Seven complained about the nature of comments, for instance, asking for too much from the research, commenting on things that are beyond the scope of the study, asking for the impossible, or posing questions that are very difficult to answer. Six respondents indicated that reviewers saw them as competitors and therefore used the opportunity to attack anyone who disagreed with their idea. One said: 'I have had experiences where the reviewer perceived the paper as an intrusion in his area or an attack and totally destroy the article. For instance, complaint about lack of some of their works citations and try to discredit authors.' Similarly, another four ECRs pointed to the lack of benevolence in the review process, with reviewers acting as gatekeepers preventing them getting published: 'Reviewers and editors usually treat authors as enemies, act as gatekeepers instead of helping authors to polish their work, they usually screen the paper to find any mistakes instead searching for valuable work. Editors reject papers just to show how prestigious is their journal.' Other reasons for bad/mixed

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

TABLE 6 Frequency of policy specification by region with percentages of cases.

	North America		UK		China		Russia		West Europe		Other	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Criteria for determining who can be named as authors of a paper	25	78	12	67	120	57	28	57	86	61	172	71
Criteria for determining the order in which authors are named in	22	69	12	67	128	61	38	78	118	84	168	69
Criteria for determining the corresponding author	11	34	7	39	124	59	10	20	53	38	153	63
Criteria for determining first author	17	53	8	44	172	82	30	61	107	76	179	74

$N = 513$, $X^2 = 87$, $df = 16$, and $p < .005$.

TABLE 7 Frequency of policy specification by subject with percentages of cases.

	Health sciences		Life sciences		Physical sciences and engineering		Social sciences		Arts and humanities	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Criteria for determining who can be named as authors of a paper	70	85	87	68	100	59	154	60	29	60
Criteria for determining the order in which authors are named	56	68	100	78	111	64	182	71	34	71
Criteria for determining the corresponding author	48	59	68	53	106	61	113	44	16	33
Criteria for determining first author	56	68	99	77	130	75	188	74	34	71

$N = 507$, $X^2 = 51$, $df = 16$, and $p < .005$.

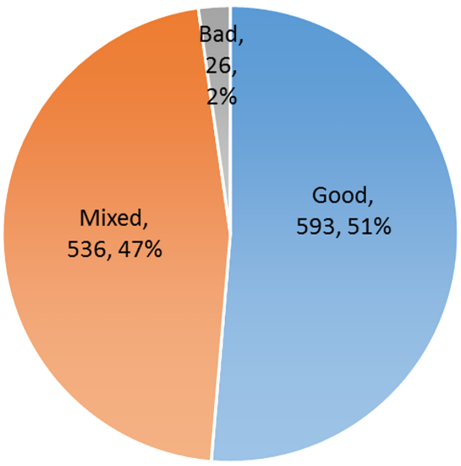

FIGURE 2 How in general did you find the experience of responding to reviewers.

experience included being asked to cite a reviewer's work (4); inappropriate language of comments, for example, impolite, aggressive (4); not reading or understanding the paper properly (4); lack of grounds for rejection (4); inconsistency or contradiction in comments (4); lack of opportunity to respond to comments (3); and lack of clarity of comments (3).

Over half of the ECRs (53.9%, 863) had been a reviewer, again a finding stressing how important a force they are in scholarly communications, despite their relative juniority and newness. Those who had were asked how they were recruited for peer review (Table 11). Nearly half ($N = 747$) did not answer and skipped this question, but of those who did, the large majority was recruited on the basis of the papers they had published. There were subject differences (Table 12), with an invitation from a supervisor being more common in physical sciences and life sciences than in the health sciences. Being contacted on the basis of contacts in editorial boards was more common in social science and humanities.

Reviewers were also asked what they had learned from the role (Table 13), and the main response was that it helped authors improve their work (77.1%); then, they said it was useful to see what other researchers were up to (66.1%) and the benefits of learning from other people's mistakes (65.1%).

Thirty ECRs used the Further Comment box to explain what they have learned from acting as a reviewer. One main theme (15 comments) was realizing the shortcoming and challenges of the peer review process, including timing, subjectivity, lack of guidelines for reviewers, lack of standards for works, lack of compensation (e.g. financial) for reviewers, lack of recognition of reviewers' work by employers, poor initial editorial judgements for letting 'schlocky works' go to peer review process, difficulty in deciding about acceptance/rejection, lack of access to research data to be able to review research in which data are used, low quality of rebuttal letters by authors, and bad choice of reviewers. Another main theme (eight comments) was that they learned much from the process, something we have learned before, but putting flesh on it, they said: it refreshed their own

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

TABLE 8 How in general did you find the experience of responding to reviewers by region.

	North America		UK		China		Russia		West Europe		Other	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Good	33	37.9	31	44.3	121	59.3	36	66.7	97	43.9	241	54.2
Mixed	53	60.9	37	52.9	80	39.2	18	33.3	117	52.9	196	44.0
Bad	1	1.1	2	2.9	3	1.5	0	0.0	7	3.2	8	1.8
Total	87	100	70	100	204	100	54	100	221	100	445	100

N = 1,081, X^2 = 24.7, df = 8, and p = .002.

TABLE 9 If good, what did you feel were the benefits? (Multiple response; $N \approx 587$).

Benefit	*N*	%	% of cases
Was a good learning experience	496	26.4	84.5
Improved my writing/ presentational skills	461	24.5	78.5
Helped understand the academic publishing process	398	21.1	67.8
Helped to plug holes in my knowledge	347	18.4	59.1
Academic recognition afforded was beneficial for career progression	180	9.6	30.7
Total	1,882	100	

TABLE 10 If mixed or bad, why was that? (Multiple response; $N \approx 547$).

Reason	*N*	%	% of cases
Reviewing process took too long	372	26.2	68.1
Reviewers' comments were superficial	305	21.5	55.9
Reviewers' comments were not informed	225	15.8	41.2
Reviewers were not receptive to new ideas	166	11.7	30.4
Reviewers badly chosen	131	9.2	24.0
No opportunities to respond to the reviewer after receiving the review	113	8	20.7
ECRs are treated as novices	108	7.6	19.8
Total	1,420	100	

knowledge of the field, learning new methods and theories, identifying the trends in their field, and learning new skills (how to publish, how to critically think and appreciate the value of peer review). Two mentioned how they have learned to perform the peer review: 'we ought to agree to participate in reviewing other's papers similar to the way we wish to have our papers reviewed and published'. One felt sad thinking his/her own paper that was rejected had been better than the one she/he was reviewing; another one complained that to 'review seriously an article is doing the authors job', and finally, one complained about

TABLE 11 Think of the last time you were recruited for a review, how were you recruited?.

Recruitment method	*N*	%
An invitation from journal because of my previous relevant publications in other journals	325	38.1
An invitation from journal because of my previous publications in the same journal	251	29.4
An invitation from my supervisor/mentor or the head of my group	165	19.3
An invitation from journal because I have contacts in the editorial board	76	8.9
Because I am a member of the editorial board	36	4.2
Total	853	100

how ECRs are exploited by the system: 'How journals and editors exploit early career researchers to do multiple reviews (five-plus) in a given year (suggesting that the journal is okay enough with the review quality to invite the reviewer back for reviews), but refuse to grant them editorial board membership'.

There are now many different types of peer review, some very traditional and others more transparent and open. When asked from a selection of six forms of peer review which they preferred (Table 14), double blind was the preferred choice, with nearly half saying so. They clearly like anonymity as triple blind was the next most popular form, albeit second by some distance (18.1%). It follows then that new and open forms of review are not that popular. Open identities attracted just over 10% of preferences, and there were really only a few takers for post-publication review (1.3%). Looking at subject differences, while there were slight variations in the percentages of preferences for different subjects (X^2 = 51.6, df = 20, and p < .005), overall, the order of the top four preferences was the same in almost all subjects as the first choice for all subjects was double blind, the second was triple blind, then open identities, and then single blind. Life scientists were more likely to be in favour of open identities and open reports compared to other subjects. Single blind was the most popular in health sciences, and double blind was most popular in social sciences. The difference among different age groups was not big but was statistically significant (X^2 = 43, df = 20, and p = 0.002), but one notable difference was that the

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

TABLE 12 Methods of being recruited for peer review by subject.

	Health sciences		Life sciences		Physical science and engineering		Social sciences		Arts and humanities	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
An invitation from my supervisor/mentor or the head of my group	16	13.6	30	22.2	46	25.7	55	16.9	11	20.4
An invitation from journal because of my previous publications in the same journal	37	31.4	33	24.4	56	31.3	103	31.7	14	25.9
An invitation from journal because of my previous relevant publications in other journals	55	46.6	60	44.4	61	34.1	110	33.8	17	31.5
An invitation from journal because I have contacts in the editorial board	8	6.8	9	6.7	12	6.7	37	11.4	7	13.0
Because I am a member of the editorial board	2	1.7	3	2.2	4	2.2	20	6.2	5	9.30
Total	118	100	135	100	179	100	325	100	54	100

$N = 811$, $X^2 = 32.5$, $df = 16$, and $p = .009$.

TABLE 13 What did you learn from acting as a reviewer? (Multiple response; $N \approx 848$).

	N	%	% of cases
How to be positive and contribute to the improvement of other people's work	654	22.7	77.1
What other researchers are doing	565	19.7	66.6
Seeing other people's errors is a good learning experience	552	19.2	65.1
Reviewing is time consuming	467	16.2	55.1
How uncomfortable it is to criticise/reject the papers of one's peers/colleagues	274	9.5	32.3
How poor writing standards are	215	7.5	25.4
Reviewers not given enough time to do a proper job	148	5.1	17.5
Total	2,875	100	

TABLE 14 What type of peer review do you prefer best as a reviewer?.

Type of peer review	*N*	%
Double blind (the reviewers don't know the identity of authors, and vice versa)	726	47.9
Triple blind (not only are authors and reviewers blind to each other's identities but editors are also blind to the identity of both)	274	18.1
No preference/don't know	181	11.9
Open identities – where reviewer's name is published	162	10.7
Single blind (the author does not know who the reviewers are)	111	7.3
Open reports – where only the content of the review is made public	44	2.9
Post-publication – where papers are reviewed after publication	19	1.3
Total	1,517	100

younger group of 21–25-year-olds were more open to the ideas of open identities and open reports when compared to other age groups. There was also gender difference for two of the options. While females were more traditional, and 57.5% of them preferred double blind compared to 51.7% of males, males were a little more open to open identities (14.3% of males compared to 9.6% of females) ($X^2 = 13$, $df = 5$, and $p = .023$).

We asked them what the main reason for their preference was, and as expected (and as informed by the interviews), anonymity was the main reason (Table 15). As we learned from the interviews, ECRs do not like putting their head above the water and attracting unwelcome criticisms (Rodríguez-Bravo *et al.*, 2017). Around 40 used the 'other' option to provide more reasons for their choice. Those who chose blind peer review highlighted anonymity and benefits in terms of fairness and unbiased review. A few argued that they did not choose open methods because of a possible backlash from the community or the fact that they, as ECRs, might not be able to criticize more senior authors. Those who chose open identities mentioned that it increases transparency and prevents the use of impolite language in comments. Some mentioned that the reason for their choice was that they had only experienced that type of peer review and had no knowledge of other types to be able to compare.

Despite the general contentment with peer review, when asked if 'peer review could be improved for ECRs', they were mainly of the opinion that it could be improved, over 4 in 5 thought so (82.5%, 1,278 said yes and 271, 17.5% said no). Suggestions were provided as to how they might improve things, and of the five suggested, being more constructive came out on top ($M = 4.5$). Being more open to innovative ideas came a close second ($M = 4.28$). Post-publication peer review also

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

obtained some support, which contradicts the support for anonymity (Table 15) expressed above. However, post-publication was the least popular of the suggested improvements. This apparent contradiction might be because the question about peer review type (Tables 14 and 15) was about ECRs as reviewers, while this question on improvement might have been understood by some respondents as improvements in relation to when ECRs are being reviewed. Figure 3 provides the percentages of responses in a diverging stack bar, with green bars showing mean values of Likert scales.

There was statistically significant difference between age groups but only in the case of 'more rigorous assessment…'. The older the respondents, the higher the agreement with the statement. (ANOVA; $F = 4.1$, $df = 4$, and $p = .003$), with an average of 3.8 for those in the 21–25 years age group and 4.3 for those in 40+ years age group. The only notable subject difference was related to adopting cascading peer review, which was more favoured by health and life sciences compared to the other three subject groups.

As was the case with the interviews, ECRs are either happy with publishers managing the review process or cannot think of anyone doing it better. About 82% (1247) of ECRs thought that publishers should continue to organize peer review. When else asked who should organize peer review from those who said publishers should not do so, 277 responded. Their choices, in order of popularity, were learned or scientific societies (32.9%), independent peer review service (31.4%), research communities via thematic repositories (e.g. BioRXiv) (22.4%), and educational institutions (9.7%). The rest (3.7%) thought libraries or social media platforms should do so.

TABLE 15 What is the main reason for your choice?.

Reason	*N*	%
Anonymity is crucial for an honest and unbiased review	1,094	77.6
Transparency encourages reviewer accountability and thoroughness	285	20.2
Transparency inhibits voicing negative views/criticisms	30	2.1
Total	1,409	100

DISCUSSION AND CONCLUSIONS

Authorship and peer review are very connected processes, almost two sides of the same coin, so it makes sense dealing with them together. The findings of this survey regarding authorship and peer review are aligned with many of the findings of the preceding interview study (Nicholas *et al*., 2017; Rodríguez-Bravo *et al*., 2017), which, of course, adds strength to our conclusions. This is especially so in the case of how experienced ECRs are and how large a contribution they make to both activities. Thus, a large majority of ECRs have authorship experience, with around three-quarters having published between one and five papers in 2018. They are also heavily involved in the production of papers in a variety of ways, such as writing, conducting field work, performing experiments, data analysis, and literature reviewing. Their role as scholarly multi-taskers is confirmed, and the only roles they do not fulfil are those with respect to financial matters, and they cannot undertake these because of their junior and untenured status. A significant proportion (41%) have a major influence on authorship decisions. Three quarters also said they were subject to authorship policies; nevertheless, a significant minority (around 150) did not feel recognized sufficiently for what they do. What they want is clear rules (around half said they were subject to policies/rules) so that decisions are not up to individuals; they want decisions to be more inclusive and democratic and require a system that is based on the level of contribution rather than on seniority. There is also evidence of gender discrimination against women that merits further investigation as they are more likely to say they did not have an influence on authorship decisions. Authorship decisions in the social sciences and humanities are thought to be more democratic, possibly because research projects in the social sciences and humanities are smaller and consequently have fewer authors involved, which reduces the opportunities for friction.

Various factors play a role in authorship decision-making, including institutional culture, disciplinary norms, and authorship policies, and vary by institution, country, and subject. The standout difference here is the fact that over 90% of Chinese ECRs said they were the subject of authorship policies, but the figure was less than a third for the UK. The role and order of authors are interpreted and credited differently in disciplines and countries, but generally, the order of authors is all-important, including

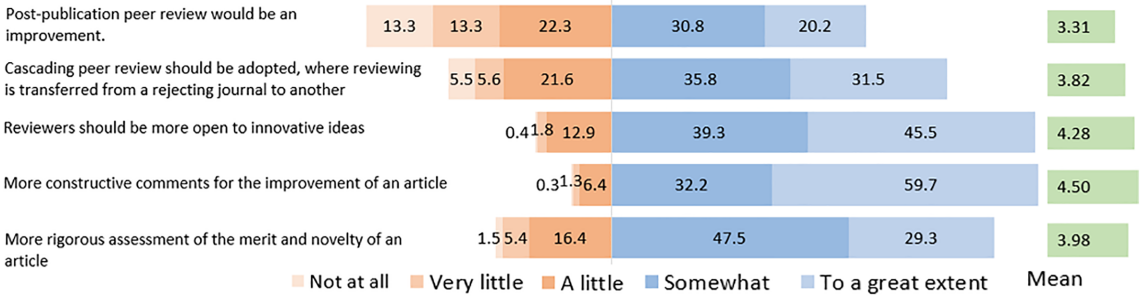

FIGURE 3 To what extent do you think each of these actions will improve peer review for ECRs? ($N \approx 1{,}165$).

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

for established researchers (Elliott *et al*., 2017). Being the first author is more important in the physical sciences, especially for the Chinese where it comes with significant reputational (and financial) rewards. The Chinese are also very concerned about being named ad corresponding author, which also comes with a financial 'bonus', albeit not as much as being the first author. This finding came mostly from our interviews, ECRs state that their overarching goal is to obtain a prominent position in the author list or be the corresponding author, and for these reasons, authorship is of much concern. For example, ECRs complained of academic staff being given authorship and rank when they are not significantly involved in the paper and those who contribute greatly to the paper not being given their just deserts in terms of author rank. From the Harbingers project (Nicholas *et al*., 2019), we discovered that, as ECRs matured over the 3 years of interviewing, authorship had become less of an issue because they developed an understanding of the underlying rules of the game, and from the information we obtained from the survey, this is due partly to the increased introduction of institutional and government policies.

When it comes to peer review, ECRs are well experienced and embedded in the process, with three-quarters involved in responding to reviewers and slightly more than half having served as a reviewer. This was a lower than what was found in the Harbinger interviews, where 85% had experience of responding to reviews (Rodríguez-Bravo *et al*., 2017). Past research has shown that ECRs are industrious in peer review and benefit from it as well (Casnici, Grimaldo, Gilbert, & Squazzoni, 2016). This also seemed to be the case in the survey, with half of those who responded to reviewers having good feelings about the process and only a tiny minority (2%) feeling negative about their experience, and this was the same figure as for the interviews. The rest had mixed feeling. Interestingly, Chinese and Russians ECRs seemed the happiest. This might be due to the lower expectation of ECRs in China and Russia when they submit to international journals or simply a different peer review culture prevailing in those countries.

ECRs see several benefits in being a reviewer, with the main one being that it helps in improving their own papers, as Warne (2016) also found. ECRs also learn how to positively contribute to improving a researcher's work. The main downsides are seen to be the length of the process and the superficial and uninformed comments they received and the fact that the reviewers are not open to new ideas. However, there is some unhappiness that there is poor recognition and reward for conducting peer review and that they are sometimes exploited by the system by having to do many reviews without any form of recompense. While they do not see the current system as perfect, they are traditional, and most of them prefer the current practice of blind peer review. There was only a little support for the types of peer review that have open identities. Previous studies have also shown that researchers' generally preferred method of peer review is double-blind review (Mulligan *et al*., 2013; Ware & Monkman, 2008) and that maintaining anonymity is the preference for most of researchers (Mulligan *et al*., 2013; Publishing Research Consortium, 2016). Our interviews also found that ECRs prefer double-blind peer review for the anonymity it affords, which is especially important because they believe they might be penalized because of their juniority.

LIMITATIONS

This survey relied on ECRs agreeing to take part, and this, combined with a large response from China, may have influenced some findings. The subject categories were based on SCOPUS grouping; however, we are aware that some disciplinary differences exist within the categories on which we reported. As the demographics questions were optional, some participants did not complete them, resulting in slightly different respondent numbers when finding are cross-compared.

INFORMED CONSENT STATEMENT

The introduction page of the survey had an informed consent statement that said 'By clicking NEXT and completing the survey, you are indicating that you have agreed to take part in this research and give permission for us to gather and analyse the answers you provide'. The respondents could skip any questions (except a few questions that had logic built in them for redirecting purpose) and leave the survey at any point they wished.

ACKNOWLEDGEMENTS

We acknowledge Dianyun Chen and Jiayun Wang of Wuhan University who helped with the Chinese coding; funding from the University of Malaya (Project No BKS079-2017); Tomàs Baiget; and those organizations that helped distribute the questionnaire: Wiley, Emerald, Cambridge University Press, Public Library of Science, Eurodoc, Sense about Science, and UCL library.

REFERENCES

Bohannon, J. (2013). Who's afraid of peer review? *Annual Review of Information Science and Technology*, *45*(1), 197–245. https://doi.org/10.1002/aris.2011.1440450112

Casnici, N., Grimaldo, F., Gilbert, N., & Squazzoni, F. (2016). Attitudes of referees in a multidisciplinary journal: An empirical analysis. *Journal of the Association for Information Science and Technology*, *68*(7), 1763–1771. https://doi.org/10.1002/asi.23665

Dance, A. (2012). Authorship: Who's on first? *Nature*, *489*(7417), 591–593. https://doi.org/10.1038/nj7417-591a

Elliott, K. C., Settles, I. H., Montgomery, G. M., Brassel, S. T., Cheruvelil, K. S., & Soranno, P. A. (2017). Honorary authorship practices in environmental science teams: Structural and cultural causes and solutions. *Accountability in Research*, *24*(2), 80–98. https://doi.org/10.1080/08989621.2016.1251320

Ford, E. (2013). Defining and characterizing open peer review: A review of the literature. *Journal of Scholarly Publishing*, *44*(4), 311–326. https://doi.org/10.3138/jsp.44-4-001

Kornhaber, R. A., McLean, L. M., & Baber, R. J. (2015). Ongoing ethical issues concerning authorship in biomedical journals: An

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.

integrative review. *International Journal of Nanomedicine*, *10*, 4837. https://doi.org/10.2147/IJN.S87585

Laudel, G., & Gläser, J. (2008). From apprentice to colleague: The metamorphosis of early career researchers. *Higher Education*, *55* (3), 387–406. https://doi.org/10.1007/s10734-007-9063-7

Lee, C. J., Sugimoto, C. R., Zhang, G., & Cronin, B. (2013). Bias in peer review. *Journal of the American Society for Information Science and Technology*, *64*(1), 2–17. https://doi.org/10.1002/asi.22784

Merga, M. K., Mason, S., & Morris, J. (2018). Early career experiences of navigating journal article publication: Lessons learned using an autoethnographic approach. *Learned Publishing*, *31*(4), 381–389. https://doi.org/10.1002/leap.1192

Müller, R. (2012). Collaborating in life science research groups: The question of authorship. *Higher Education Policy*, *25*(3), 289–311. https://doi.org/10.1057/hep.2012.11

Mulligan, A., Hall, L., & Raphael, E. (2013). Peer review in a changing world: An international study measuring the attitudes of researchers. *Journal of the American Society for Information Science and Technology*, *64*(1), 132–161. https://doi.org/10.1002/asi.22798

Nicholas, D., Rodríguez-Bravo, B., Watkinson, A., Boukacem-Zeghmouri, C., Herman, E., Xu, J., … Świgoń, M. (2017). Early career researchers and their publishing and authorship practices. *Learned Publishing*, *30*(3), 205–217. https://doi.org/10.1002/leap.1102

Nicholas, D., Watkinson, A., Boukacem-Zeghmouri, C., Rodríguez-Bravo, B., Xu, J., Abrizah, A., … Herman, E. (2019). So, are early career researchers the harbingers of change? *Learned Publishing*, *32*(3), 237–247. https://doi.org/10.1002/leap.1232

Nicholas, D., Watkinson, A., Jamali, H. R., Herman, E., Tenopir, C., Volentine, R., … Levine, K. (2015). Peer review: Still king in the digital age. *Learned Publishing*, *28*(1), 15–21. https://doi.org/10.1087/20150104

Publishing Research Consortium. (2016). *Publishing research consortium peer review survey 2015*. London, England: Mark Ware Consulting. Retrieved from http://publishingresearchconsortium.com/

Research Information Network. (2010). *Peer review: A guide for researchers*. London, England: Research Information Network. Retrieved from http://www.rin.ac.uk/system/files/attachments/Peer-review-guide-screen.pdf

Rodríguez-Bravo, B., Nicholas, D., Herman, E., Boukacem-Zeghmouri, C., Watkinson, A., Xu, J., … Świgoń, M. (2017). Peer review: The experience and views of early career researchers. *Learned Publishing*, *30*(4), 269–277. https://doi.org/10.1002/leap.1111

Sabaj Meruane, O., Gonzalez Vergara, C., & Pina-Stranger, Á. (2016). What we still don't know about Peer Review. *Journal of Scholarly Publishing*, *47*(2), 180–212. https://doi.org/10.3138/jsp.47.2.180

Ware, M., & Monkman, M. (2008). *Peer review in scholarly journals: Perspective of the scholarly community an international study*. London, England: Publishing Research Consortium. Retrieved from http://www.publishingresearch.net/PeerReview.htm

Warne, V. (2016). Rewarding reviewers – Sense or sensibility? A Wiley study explained. *Learned Publishing*, *29*(1), 41–50. https://doi.org/10.1002/leap.1002

© 2019 The Author(s).
Learned Publishing © 2019 ALPSP.