Early career researchers and their publishing and authorship practices

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Abstract

This study presents findings from the first year of the Harbingers research project, a 3-year longitudinal study of early career researchers (ECRs), which sought to ascertain current and changing habits in scholarly communication. The study recruited 116 science and social science ECRs from seven countries who were subject to in-depth interviews, and this paper reports on findings regarding publishing and authorship practices and attitudes. A major objective was to determine whether ECRs are taking the myriad opportunities proffered by new digital innovations, developing within the context of open science, open access, and social media, to publish their research. The main finding is that these opportunities are generally not taken because ECRs are constrained by convention and the precarious employment environment they inhabit and know what is best for them, which is to publish (in high impact factor journals) or perish.

AIMS AND OBJECTIVES

This paper investigates the publishing and authorship practices of early career researchers (ECRs), the newest and biggest wave of scholarly researchers. In doing so, it sets out to fill a long-felt gap in the state of knowledge concerning the practices characterizing ECRs’ tackling this crucial aspect of their initiation into the profession. To date, knowledge on the topic is derived mostly from the few major quantitative studies that have investigated young researchers as part of the research population as a whole to see how different or similar they are. CIBER studies on social media use (Nicholas & Rowlands, 2011; Rowlands, Nicholas, Russell, Canty, & Watkinson, 2011) and trustworthiness (Jamali et al., 2014; Nicholas et al., 2014; Nicholas, Watkinson et al., 2015; Nicholas, Jamali et al., 2015; Tenopir et al., 2015) and Tenopir et al.’s (2016) study into the motivations of academic authors in selecting a journal in which to publish are part of this camp. Müller’s (2012) interviews-based qualitative exploration of the role
that authorship plays within the everyday contexts of young researchers’ collaborative work is the closest to the study presented here, albeit more limited in scope (one country, 15 post-docs and just life sciences).

Setting out to draw a more comprehensive and detailed picture of ECRs’ research dissemination practices, we sought to discover how productive they are in publishing terms, what the authorship policies/practices they are subject to are and which they might have issues with, what influence they have on where research is published, whether they have a publishing strategy, and – if so – what it is. We also wanted to establish whether ECRs are taking the myriad opportunities proffered by new digital innovations, developing within the context of open science, open access (OA), and social media, in order to publish their research. Or are they shackled by conventions within their discipline or by the pressures within their research group? In this regard, we are interested in: (1) practices, preferences, and policies regarding OA publishing; (2) whether ECRs are using the new social technologies to disseminate their research more informally; and (3) whether they make their data available/share it.

The data upon which the paper is built come from the first year of a 3-year longitudinal study of ECRs, which sought to establish whether they are going to be the harbingers of change when it comes to scholarly communications, in general, and their career?

Researchers who are generally not older than 35 and 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 are they researchers in established or tenured positions. In the case of academics, they are non-faculty research employees of the university. In addition, included were a small number of ECRs who had come from or were in positions that were essentially servicing clinicians or researchers.

The focus is on ECRs in the sciences and social sciences, which is where the funders’ (Publishing Research Consortium) main priorities lie and also where the majority of ECRs are based. A wide geographical reach was sought as we wished to support research on issues facing the STM industry globally. Balancing the need for representativeness (with regard to size, importance, level of development, and language) with Publishing Research Consortium national interests and the availability of interviewers on the ground, China, France, Malaysia, Poland, Spain, UK, and USA were selected.

METHODOLOGY

Full details can be found in an article published in an earlier issue of this journal (Nicholas et al., 2017), with an abbreviated version provided here. Long, structured interviews were conducted face-to-face and/or remotely (Skype or telephone). A detailed interview schedule was compiled and sent to interviewees ahead of the interview. The interview schedule contained around 60 questions, and the interview took between 60 and 90 minutes to complete. For the purposes of this paper, we are concerned with 11 of the questions:

Q1. What contributions have you made to the papers, which you have co-authored?
Q2. Does your research team/department/university have an authorship policy?
Q3. Would you do things differently if you had a say in this?
Q4. What influence (if any) have you had on the choice of journal in which to publish your research?
Q5. Does your research team/department/university/funder have a policy in regard to OA publishing?
Q6. What do you think are the advantages and disadvantages of OA publishing from the point of view of the author?
Q7. Do you think OA publishing advances science and research, or are you worried that it will dilute the quality of publications, or do you agree/disagree with both propositions? If so, how?
Q8. Do you have a preference for journals with innovative features, such as video articles (e.g. Jove), when placing your research?
Q9. Is there pressure on you to publish in particular top-ranked journals and, if so, how do you think this affects scholarly communications, in general, and your career?

Scope and Definitions

There are various definitions of ECRs (Poli, 2016; for more detail see http://ciber-research.eu/download/20160901-Harbingers-ECRs_literature_review.pdf), and they vary from country to country. After an examination of the literature and consultations with international partners, this definition was adopted:
Q10. Do you have a conscious publication strategy relating to your research and is that to do with obtaining a tenured/ established position and, if so, please describe?

Q11. Would you prefer to make public your research findings in less formal ways, such as blogs, which could make them more visible?

Data have also been sourced from the CVs of ECRs, which they provided ahead of the interviews, and from elsewhere in the interview schedule. The full list of questions can be found on the CIBER website (http://ciber-research.eu/downloads/20160916-harbingerresearch_instruments.pdf).

Interviews were conducted by national interviewers, largely in their own languages. The proceedings of the interviews were taken down in note form. A transcript of the interview was returned to the interviewee for validation. The record was then translated into English for all non-English-speaking countries and then manually coded using a heuristic approach and a standardized thematic framework (see http://ciber-research.eu/downloads/20160916-harbingerresearch_instruments.pdf).

A total of 116 ECRs from the sciences and social sciences were recruited from seven countries (Table 1). To reach this number, interviewers for the case countries were given a recruitment quota of 20–29 for the UK and USA (the larger number a reflection on the importance of these communities to STM publishers) and 10–15 for the other countries. Within countries, the general guidance was to build the sample along the following lines: (1) two-thirds science and one-third social sciences, (2) a representative balance of men and women, and (3) a range of ages within the 20s and 30s age groups. ECRs came from 81 institutions.

Details of recruitment methods can be found in the aforementioned article (Nicholas et al., 2017).

RESULTS

The findings presented here are based on three broad sets of data, which are woven together to create the narrative:

- Information from the 116 ECRs, which is variously summarized, paraphrased, and directly quoted. This is what ECRs say they behave like and how they view things, and it is not necessarily wholly informed. Its value is that it shows us what they think.
- Contextual comments from the national interviewers – all senior researchers themselves, who provide important background data in order to understand what was being said and why.
- Findings from the published literature, which provide support and authority for the information above.

TABLE 1  Country-wise ECR profiles broadly compared.

<table>
<thead>
<tr>
<th>Country</th>
<th>No.</th>
<th>Subject</th>
<th>Gender</th>
<th>Age</th>
<th>PhD</th>
<th>Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>13</td>
<td>Science: 70%</td>
<td>Female: 46%</td>
<td>Twenties: 46%</td>
<td>8% Doctoral students</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soc.Sci.: 30%</td>
<td>Male: 54%</td>
<td>Thirties: 54%</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>14</td>
<td>Science: 82%</td>
<td>Female: 35%</td>
<td>Twenties: 65%</td>
<td>100% Postdocs</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soc.Sci.: 18%</td>
<td>Male: 65%</td>
<td>Thirties: 35%</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>12</td>
<td>Science: 58%</td>
<td>Female: 50%</td>
<td>Thirties: 100%</td>
<td>100% Postdocs</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soc.Sci.: 42%</td>
<td>Male: 50%</td>
<td>Thirties: 50%</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>10</td>
<td>Science: 80%</td>
<td>Female: 40%</td>
<td>Thirties: 40%</td>
<td>50% Doctoral students</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soc.Sci.: 20%</td>
<td>Male: 60%</td>
<td>Thirties: 60%</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>18</td>
<td>Science: 78%</td>
<td>Female: 44%</td>
<td>Thirties: 60%</td>
<td>28% Doctoral students</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soc.Sci.: 22%</td>
<td>Male: 56%</td>
<td>Thirties: 28%</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>21</td>
<td>Science: 62%</td>
<td>Female: 38%</td>
<td>Thirties: 24%</td>
<td>33% Doctoral students</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soc.Sci.: 38%</td>
<td>Male: 62%</td>
<td>Thirties: 76%</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>28</td>
<td>Science: 79%</td>
<td>Female: 41%</td>
<td>Thirties: 27%</td>
<td>34% Doctoral students</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soc.Sci.: 21%</td>
<td>Male: 59%</td>
<td>Thirties: 73%</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

ECR, Early career researcher.

ECRs publishing and authorship practices

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Between them, the 116 ECRs published an impressive 1,178 journal articles in peer reviewed journals over their short research lifetime, with the average ECR having published over 10 papers.

After papers, conferences are a popular venue utilized by ECRs for delivering research findings. Conferences are no less important for more senior researchers (Watkinson et al., 2016; Wolff et al., 2016a, 2016b), but for ECRs, the rewards of disseminating the results of their work in this way are greater: conferences are generally easier to get into and therefore offer a useful proving ground and a leg up the publishing ladder. There is a hierarchy of conference contributions of course, presentations, posters, publishing in proceedings, and posters. Altogether, ECRs produced 711 published proceedings, most of which – crucially for them – are indexed in the Web of Science (WoS) and Scopus. Conferences count more in certain disciplines, such as computer science and physics, as well as in certain countries. Thus, in Poland, partly because of the language barrier faced when publishing in high impact factor (IF) journals and partly because they obtain reputational points for them, conferences and presentations/posters are much favoured. Malaysian ECRs also publish widely in conference proceedings, encouraged by the fact that participation in conferences attracts institutional financial support for ECRs from research-intensive universities. However, in Malaysia, unlike papers, conference papers do not count towards reputational scores.

**AUTHORSHIP**

As Müller (2012) points out, today’s ECRs deal with the demand to be both a highly competitive individual and a member of research teams. With publications, as important for ECRs’ career development as they are, questions of authorship inevitably play a pivotal role within these negotiations of collaboration and competition. Nevertheless, ECRs’ authorship experiences align with what we know of academic authorship in general, which is hardly surprising given that publications establish reputation, signal productivity, and serve as yardsticks in deliberations of appointments, promotions, and funding for senior and novice researchers alike. Thus, for example, the order in which author names appear in the by-line of an article, assumed as it is to reflect the individual’s level of contribution to both research and manuscript development, may be hotly contested among members of a research team, be they established researchers or ECRs (Brand, Allen, Altman, Hlava, & Scott, 2015; Dance, 2012; Elliott et al., 2017; Kornhaber, McLean, & Baber, 2015; Watkinson et al., 2016). Indeed, the majority of our ECRs in all countries say they are aware of – although not invariably happy with – their university’s or department’s formal/informal authorship policies as to who can be named as authors and the order in which they are named. However, there are differences between countries in regard to how formal or informal policies and practices are.

In China, where the ranking of authors is viewed as being very important – counting as it does towards reputation and promotion – there are very strict rules. Thus, the first author is the person who undertakes most of the research and writes most of the paper. To complicate matters somewhat, there can be joint first authors where each joint first author splits the normal first author’s reputational credit. The corresponding author’s contribution is considered almost the same as the first author, so most institutes give them similar reputational credit. A collaborating author, the third authorship rank, is the researcher who assists the research by collecting and analysing data, and translating and polishing the paper. Minor contributions might merit the reward of authorship. Despite these formal arrangements, ECRs report encountering problems with coauthorship, which arise from group work. The sharing of credit is a particularly thorny problem in domestic collaborations because Chinese ECRs so desperately want to be the first or corresponding author, so their work can be recognized by their institutes and funders. Complaints also arise about mentors who do not shoulder research responsibilities but insist on being listed as an author. Most interviewees have published papers on their research with their mentors who are listed as first authors. As we shall learn, the authorship problems young Chinese researchers encounter are in fact globally experienced.

In Malaysia, the rules of authorship are fairly cut and dry: To be listed as an author, you must meet these criteria: you must be involved in project design and research protocols, collect data and analyze results, and participate in drafting and writing the paper. They are also transparent: rules are now polished and published, the problem with who should sit in the author list is not a big issue in my field. Order is decided like this: To earn authorship, all in the team must be intellectually engaged and that the order is decided by the corresponding author. Authorship policy can vary, however, by discipline. For instance:

- In my lab, the author list is strictly ranked. The top researcher is normally at the end of the list, and sometimes the person who owns the lab, owns the research grant is also given credit as author. The person who actually did the work goes first, normally the research student or the postdoc. The research supervisors came after the student authors (ECR, sciences).
- I am always the first author if I write the paper entirely, but I will always put in my supervisor’s name, although I work on my own, I don’t rely on him anymore, but I always, invite him to give input (ECR, social sciences).

In France, things are less prescriptive, with French ECRs saying that there is no authorship policy as such, but there are informal rules that are accepted by the community and differ according to broad disciplines, as in Malaysia. For mathematicians, research is often solitary, and papers can have just one author, but where this is not the case, alphabetical order is the rule as all contributions are held to be equal. For most of the others (biology, physics, computer science and chemistry, and interdisciplinary research), the main contributor is the first author. The head of the research group who obtains the funds is the last author. Between the first and the last author, in the
'middle' as it is called in French, come the other contributors who undertook experiments or specific tasks, and they are mainly displayed in alphabetical order. All ECRs feel comfortable with these rules, and most would not change anything. A few did suggest changes, and they mostly concern packing people into the author statement: Provide the precise contribution of every author in order to know who did what and avoid 'parasites'. Stop adding too many people.

At Polish universities as well, there are only unwritten and variable practices. Every group, department, and so on has their own house rules. Sometimes, mentors or heads of the groups are placed in first position, but in other cases, they are simply contributing authors. It all depends on the individual or group/departments. There are few complaints among ECRs, other than not wanting professors to be added as a matter of course to their publications, even if they did not contribute to them.

It is a similar situation in Spain where there are no fixed authorship policies. Group heads decide on their own criteria. However, there are typical practices. As in France, they differ by discipline. In STM fields, all the members of the group appear as authors. First position goes to those who did the experimental work and last position and the status of corresponding author goes to mentors. In the social sciences, where ECRs are part of groups, usually small ones, mentors or heads of the groups are usually placed in first position. Again, the main concern of ECRs is that too many people are seen to be taking a free ride on the back of 'their' papers. Thus, eight ECRs – making the Spanish the most critical group – said they would do things differently if they were fully in charge and that they would not include those who did not work directly on the paper, and the order would reflect the importance of the contribution made.

In the UK, very few (two) ECRs admit to having, or being aware of, an authorship policy that governed or guided their publications efforts. A total of 15 say there is no policy, and another 4 are not sure but not aware of one. This, of course, does not mean they have loose working arrangements, and these matters are discussed. Typically, they were listed first on more than half their articles. The deal was that if you wrote it and did most of the work, you went first. A few were sole authors. There is little sense that they are very junior partners. Asked whether they would do things differently if it is up to them, six say they would, and their suggestions include collaborate rather than compete; authors must have made a contribution (senior people get listing when it is not merited); order should be according to the amount of input; and the main contributor should come first.

A far higher proportion was aware of policies in the USA, with 12 out of 28 saying they have one. These policies originate from a whole range of places, including the laboratory, department, university, and professional associations. For example, one ECR reports that the research group used the National Science Federation’s (NSF) responsible conduct of research guidelines, and another group said that Institute of Medicine guidelines are the default. However, several ECRs report difficulties in a multidisciplinary group where a disciplinary set of standards, which they are used to, was different from the set of standards accepted by the rest of the group. These examples are taken from replies made by ECRs who did not know of a general policy.

In spite of the wording of the question, the comments associated with practices in the UK and the USA suggest that just because there was no author policy at a university or departmental level, there was a policy or at least a norm governing the order of authors and related conventions at group level even if it was written down nowhere.

As we have seen, being first author is seen as an important reputational asset for ECRs, a sign of how important their contribution is, and an indicator as to whether the journal choice is theirs or not. So, how often are ECRs first authors? In fact, surprisingly perhaps, for ECRs to be first author is, on the whole, not that difficult. Thus, it is normal for them to be first author on any scholarly outputs, including papers, based on their dissertation. Most principal investigators (PIs) allow postdocs to be first authors when they are the ones who have undertaken most of the research for a paper. It can also depend on country, and China is an interesting and complex case. Thus, in China, most universities acknowledge that postdocs can be first authors if they put their supervisors’ name before theirs! So, an ECR might be the first author who did the main research, but their name is placed second, a case of having two first authors. In most cases, ECRs do this to please their mentors or – because their mentors are more influential and well-known – in the belief that it will help them to get published.

ECRs are, typically, first authors in around one-third to one-half of all the papers to which they contribute, but it can vary, and in France, the proportion is more like 51–75%.

**JOURNAL CHOICE**

ECRs’ replies to the question What influence (if any) have you had on the choice of journal? indicated that, often, they do have a significant influence, with, for instance, 11 out of 14 French, 17 out of 18 Spaniards, 10 out of 13 Chinese and 8 out of 10 Polish ECRs saying they did. Influence seems to be a little less in the UK and USA however, where a quarter say they had no influence at all. The extent of influence depends on several things:

- Colleagues: Other members of the group to which they belong and their supervisors/mentors. It is a well-known feature of ECR life that their choices must suit the other parties involved in their undertakings (Brechelmacher, Park, Ates, & Campbell, 2015; Cusick, 2015). Thus, for the great majority of those ECRs in the USA and the majority in the UK who research in a group, journal choice is a group decision. Where ECRs are not in a group, as is, for example, the case for many social scientists, they do make decisions on their own but not always as there are always supervisors and mentors to consult. In the
Underscoring previous evidence on the strategic importance accorded to publishing in high IF journals (Borrego & Anglada, 2016; Pepermans & Rousseau, 2014; Rowlands & Nicholas, 2005), which holds true for novice researchers just as much as for their senior counterparts (Müller, 2012; Nicholas, Jamali et al., 2015), the universal directive to do so is found to be the overriding consideration for our ECRs. To add to this the assessment criteria, mandates, and lists that abound, and we find that the choice is constricted. In several countries, they must refer to lists of acceptable journals. A case in point is Poland, where ECRs are formally directed towards a government list (moreover, the top of the list) and appear to have limited room for manoeuvres. This is also the case in China, France, Malaysia, and Spain, but their lists tend to be the proprietary ones, such as the journals indexed by the WoS and Scopus.

It is difficult to imagine ambitious ECRs in the UK and the USA even considering submitting to a journal not indexed in WoS. In these countries, ECRs appear to have more freedom, but this is still only relative. The question was not directly asked in the interview, and the role of indexing was not raised by any of the interviewees, but an examination of publications listed in the CVs shows that every one of them is WoS-listed. In these countries, ECRs appear to have more freedom in the sense that there was no mention of prescriptive lists, but that is still only relative. In the UK, the Research Excellence Framework (REF) exerts a special pressure on all researchers, but in practice, as far as choice of journals is concerned, ECRs believe this pressure only reinforces the existing pressure to go for top journals. This is in spite of the fact that the REF (UK REF) documentation makes it clear that the article itself is assessed, not the journal in which it is published; such assertions are just not believed.

ECR choice: The ability of an ECR to select the journal depends on status, a finding that echoes Müller’s (2012) observation that publications have different career value to different authors according to their position in the list of authors, with first authorship being by far the most valuable career asset for young scientists. Thus, in the case of Chinese ECRs, if they are the first author, they have a lot of influence; if they are the corresponding author, not much influence, but they can make suggestions. If they are simply a coauthor, they have no influence at all. It is not the same in France. So, while French ECRs are first author in the cases where they do the most work, they still do not have the main choice as to where to publish as that decision is very much that of their supervisor or head of the research team. French ECRs appear not to mind as they see their mentors/supervisors helping them publish in top journals and mainly because they are first authors. Indeed, they regard the practice as a kind of ‘help’ or a chain of solidarity between those who are in a secured position and those who are not. In the UK/USA, it is sometimes the practice for the principal investigator of the research project to have the choice, although the ECRs disapprove of this practice.

Criteria used when determining where to publish

When they are in a position to choose or influence where their research is published, ECRs’ overriding preference is for top journals, that is, journals perceived to be of high quality and stellar reputation, which in academe translates to high IF (Nature Publishing Group and Palgrave Macmillan, 2015). Regarding this, as Müller (2012) and Nicholas, Jamali et al., 2015 find, ECRs follow in the footsteps of their more experienced colleagues, whose list of priorities for choosing a publication venue has repeatedly been found to feature high journal quality and reputation (Nature Publishing Group and Palgrave Macmillan, 2015; Tenopir et al., 2016; Wolff et al., 2016a, 2016b). Interestingly, however, both Watkinson et al. (2016) and Tenopir et al. (2016) find senior faculty rate IF as slightly less important than their younger colleagues, a phenomenon that can be explained by the inexperienced researchers’ greater reliance on quantifiable metrics in selecting appropriate publication outlets. This is very much in line with Nicholas, Jamali et al., 2015 conclusion in their study that younger researchers rely more on trust markers and proxies, such as citations.

In addition to looking for markers of journal quality and reputation, ECRs employ a wide and overlapping range of criteria (Table 2), which – although differing by country – are mostly traditional, with ‘indexed and rated in WoS or Scopus’ being the main criteria for all. Still, not all things traditional hold sway; although researchers have been found to prefer journals with highly regarded editors over journals with unknown editors (Rousseau & Rousseau, 2012), for our ECRs, the editor and editorial board count very little. This is probably explained by the fact that ECRs are quite ignorant of the publisher background (Nicholas et al., 2017). Non-traditional criteria, such as being innovative (e.g. Journal of Visualized Experiments) or open (with respect to access and peer review), do not count much either.

Chinese ECRs, as a matter of course, check whether the journal is indexed in Science Citation Index Expanded (SCIE), Social Science Citation Index (SSCI), Arts & Humanities Citation Index (A & HCI), and Engineering Village, or Chinese indexes, such as Chinese Social Sciences Citation Index and Chinese Science
Citation Index. This is because ECRs need to reach the particular assessment requirements of their institutes, which can be very demanding, and the standing and rank or impact factor of the journal is very important. Second, they will determine whether the journal is related to their research field, and within this, they generally prefer journals that are specific to their 'small field' because that way they can have maximum impact. However, a few do opt for the journal with the highest journal impact factor (IF) and a big rejection rate (this is a desirable factor) because they want to 'challenge' themselves.

French ECRs are similar but a little more pragmatic. Whether it is their choice or that of their supervisors, they select the journal based on its relevance to the topic and its IF. In some cases, the fact that a journal is ranked in the first quartile (WoS) is an important criterion for ECRs, their supervisors, and the head of department. In France, publishing in 'indexed journals', an important reputational requisite, is implicitly understood as indexed in WoS, which has a unique position in France, especially for evaluators. A journal indexed in Scopus (and not indexed in WoS) is less highly regarded or not considered at all (as in the case of physics).

If the choice of a journal is the result of a discussion, the consensus between ECRs, the supervisors, and the head of department is based on the appropriate IF level (not necessarily the highest). However, in the case of articles having the ECR as first author, the 'high' IF argument takes prominence as it improves their chances of getting a job. Four ECRs also mention that when choosing a top ranked journal, they factor in how likely they are to be accepted. Above all, they do not want to waste time as it is a commodity they do not have in abundance. Rejections waste valuable time (but not, interestingly, for Chinese ECRs, who say rejections produce valuable advice, which improves the product).

French ECRs also consider journals acknowledged by the community as the place to publish. It is not so much a matter of prestige as having a kind of 'local' authority. They are journals that are important for their contributions to the history of the discipline at a local scale, even though they are less visible at an international level.

Malaysian ECRs are unanimous in stating that they choose journals on the basis of their relevance to their research field, and this can probably be considered true for all ECRs everywhere.

<p>| TABLE 2 | Criteria used for choosing a journal for publishing research. |</p>
<table>
<thead>
<tr>
<th>Criteria for choosing</th>
<th>China</th>
<th>France</th>
<th>Malaysia</th>
<th>Poland</th>
<th>Spain</th>
<th>UK</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indexed in WoS, Scopus</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>High JIF</td>
<td>2, For some disciplines, Chinese journals preferred</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Most relevant to the field</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
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<td>Covers specialist audience</td>
<td>4</td>
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<td>4</td>
<td>0</td>
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<td>4</td>
<td>4, For second attempts</td>
</tr>
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<td>3</td>
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<tr>
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<td>4</td>
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Note. Averages, 1 = not important to 5 = extremely important. WoS, Web of Science; JIF, journal impact factor.
even if not made explicit. Three-quarters of ECRs say this. Interestingly, after that comes choosing multidisciplinary journals related to their discipline (nearly half say that). Then, in order of popularity, come factors such as IF journals (WoS), journals listed by Scopus, journals with no page charges or submission fees, journals with an early view online function (a sure sign of rapid publication), journals approved by the university and the Ministry of Higher Education, and journals that review quickly.

In Poland, matters are highly prescribed. Firstly, and most importantly, ECRs take account of the list provided by the Ministry of Higher Education, which is updated annually. See http://www.nauka.gov.pl/ujednolicony-wykaz-czasopism-naukowych/wykaz-czasopism-naukowych-zawierajacy-historie-czasopisma-z-publikowanych-wy kazow-za-lata-2013-2016. html. The list comprises three parts: part A (the best journals, with JIFs and indexed by WoS, mostly international), part B (mainly Polish journals that do not have an IF but have a Polish score/points), and part C (Polish and international journals without JIFs but with Polish scores). List A is the best, then C, and last of all is B. The list is very important not only for individual researchers but for the universities/departments as well. Every year, the sum of points for every university is counted, and grants are provided according to sum of points. After the list, the relevance to the topic and appropriate audience are considerations.

As with their Chinese, Malaysian, and Polish counterparts, for whom metrics are all important, Spanish ECRs will first conduct an authentication check of the rankings and determine whether the journal is indexed in WoS or Scopus, but mainly WoS, as in France. They will look for journals in the first or second Journal Citation Report (JCR) Quartile. They choose top-rank journals, and if their paper is not accepted by the first choice, they will try a slightly lower one and so on until the article finally finds its acceptance level. They accept the fact that the publishing process can be long. As in China, Spanish ECRs favour specialist journals because such journals bring their research to their target audience. The quality of reviews and the duration of the publication process are two other factors they take into account. A few say that if they had the funding, they would choose OA journals, but few do.

When making (or influencing) a selection, UK and US ECRs consider the journal’s IF as the most important. However, it is not quite as simple as that because there always has to be a plan B if the research cannot get published in top journals, for whatever reason, and a plan for papers, which are already acknowledged as being less important (and there are always plenty of these). In fact, there is always tension between a wish to get into the very top journal and the need to be more pragmatic. Even in prestigious research groups, ECRs are only expected, for instance, to publish one paper out of every three or four in a top journal. Much of the research, therefore, inevitably goes to less highly ranked journals. Many ECRs emphasize that it is the research itself – and what it tells us – that is important and not any one publication. Other criteria (and possible plan B) mentioned are good chances of acceptance, familiar territory, a ‘quick journal’ (more applicable to social scientists) and ‘efficient journal’, which presumably (these are terms used by ECRs), from evidence gleaned in other parts of the interview, is not only quick but also responsive to authors. There are a small number of ECRs – less than three in both the USA and UK – who think largely just in terms of the number of publications and a similar small number who (still) aim for second- or third-rank journals that are just right for their audience. These ECRs are, to some extent, out of the rat race and can do what they like. They seem to be happy to either be in a ‘service’ capacity or enjoy working in a less demanding environment in a less important university, where teaching is a big component. In France, these people are typically those who are working out their time before moving to industry.

It is interesting to find that the ranking of journals in WoS is more important a criterion in the UK/USA than Scopus (as it is in Poland and China), although there is not much discussion about this – it is taken as read. For USA and UK ECRs in the medical sciences, being indexed by PubMed is quite important, and in any case, research funded by the US National Institutes of Health ‘must’ be submitted to PubMed.

## OPEN ACCESS

Having established in a previous study (Nicholas, Jamali et al., 2015) that (1) there is strong interest in the topic of OA among young researchers, (2) the potential value of OA to ECRs is that (at least in theory) it offers more/alternative routes to publication and hence helps them to establish their reputations more quickly, and (3) that they are generally sympathetic to the ‘open’ principles involved, the topic merited three questions. They were questions on OA policies/mandates, perceived advantages/disadvantages, and whether OA publishing advances science and research or, on the other hand, whether it would dilute the quality of papers. There was also a hypothesis to test and that was whether OA journals are conceived as easier to get into.

It might, then, have been expected that ECRs would welcome OA with open arms, especially as the results of both the Ithaka S + R US Faculty Survey (Wolff et al., 2016a) and the Ithaka S + R/Jisc/RLUK Surveys of UK Academics (Wolff et al., 2016b) indicate that OA has become important to researchers, with 64% of US and 57% of UK respondents strongly agreeing that they would be happy to see the traditional subscription-based publication model replaced entirely by an OA system. However, it seems that whilst the principle of OA is growingly endorsed, that is not the case where it comes to practice; indeed, a recent survey (Nature Publishing Group and Palgrave Macmillan, 2015) has found that the option to publish via OA was among the least important factors driving authors’ choice of where to submit. By the same token, according to Borrego and Anglada (2016), OA is a factor of marginal interest for authors when deciding where to publish. Similarly, in the aforementioned study of the motivations that influence US academic authors in selecting a journal in which to publish (Tenopir et al., 2016), OA was rated the lowest in importance, even if graduate student
researchers and postdoctoral researchers rated it as slightly more important than faculty.

Our results also indicate that the principles of OA are accepted by ECRs, but in practice, they are not focused on OA publishing, and they are especially lukewarm about depositing papers in institutional repositories. This is because they are preoccupied with chasing the high IFs that typically are not associated with OA journals and also because they obtain no reputational credit for making their publications OA. There is also some confusion in some countries, but not so much in the UK/USA, about what OA is. Thus, for instance, 8 out of 13 Chinese ECRs, initially anyway, told us that they had never heard of OA, although, when it was explained, it turns out that they had, but they perceived OA journals to be predatory journals. There are, however, discipline differences, with scientists being more familiar with the mechanics and details of OA.

Nevertheless, the hypothesis that ECRs publish in OA journals because they are easier to get into, posed to ECRs in all countries, was roundly rejected. There appears to be a lot less distrust of OA than there once was, which is wholly in line with the findings of both of the aforementioned Nature Publishing Group and Palgrave Macmillan (2015) survey and the CIBER study of trustworthiness in the digital age (Watkinson et al., 2016), according to both of which a decreasing number of authors are concerned about perceptions of the quality of OA publications.

Policies/mandates

According to Ithaka Surveys (Wolff et al., 2016a, 2016b), academics on both sides of the Atlantic strongly support government policy mandating that publicly funded scholarly research be made freely available, with 72% of US and 67% of UK respondents saying so. However, OA seems to be more popular in theory than in practice and not only among ECRs, as CIBER findings indicated. Asked whether research policy directives and mandates influence where they publish their research, only 20% said yes, heavily; 36.3% said yes, somewhat; about a quarter said not at all; and the rest said they were not aware of any policies (Jamali et al., 2014).

Thus, very much in line with the state of affairs described by their senior counterparts, most of our ECRs believe they are either not subject to OA mandates or they are not aware of them. The US Office of Science & Technology Policy directive that all federal agencies must issue policies for public access to their funded research was not mentioned by the interviewees. Moreover, a high proportion of the US interviewees (23 out of 28) say that their university has no policy on OA publishing. One of the few ECRs, who is aware of policies, provided one of the very few mentions of institutional repositories/green OA: The university has started a Harvard-type system to obtain copies for the IR. They look for an OA journal when placing their research. By the same token, in France, 10 out of 14 ECRs say there are no OA policies in their institutions, with the rest saying they did not know. This is not surprising as only a very few research institutions have OA publishing policies in France. There are no mandates at all in favour of Gold. Similarly, in Malaysia, only 4 of the 12 ECRs say they knew of policies. Spain is an interesting case with a similar proportion (one-third) saying they knew about mandates but only half obeying them. In Poland also OA is not widely practiced, and there are hardly any mandates. Only one ECR said that funds are available to support OA publishing.

Only in the UK is OA mandated by many institutions and most funders as well as being the subject of a comprehensive government policy. Half of the ECRs are aware that their institution has a policy, and a quarter made the point that their funders had one. Policies include publishing in hybrid journals, and most spoke about placing papers in an institutional repository. Some mentioned that older professors are very wary of OA policies and OA itself. Moreover, even if UK ECRs are not always sure whether their institutions have a policy or not, they are much more aware of their funders’ policies.

Advantages/disadvantages of OA publishing

The fact that ECRs are not familiar with mandates, or are not subject to any, does not mean they have no opinions about the strengths and weaknesses of OA as the following comments demonstrate:

Advantages

- Opens the closed world of publication (a reference to firewalls) to more researchers.
- New ideas can be dispersed more rapidly, widely, and, in turn, this triggers further research.
- Provides more immediate and increased visibility.
- Gives more personal control over research work as it can be disseminated more freely.
- Easier to re-use data.
- Provides a larger audience for a paper.
- Obtain more citations and, hence, an improvement in reputation.
- It is ethical to do so because of the public money involved.

Disadvantages

- Tend to be less-established journals that are OA.
- Predatory journals that inhabit the OA space can give a wrong impression of the status of OA journals.
- Quality is low or wholly missing because anyone can publish anything as long as they can pay.
- It is not a level playing field: only groups with funding can publish in OA journals and so obtain more citations.
- Open Archive Repositories do not have embedded peer review systems.
- Easier to steal information.
- Fears (no more than that) of light touch peer review.
- It is not a sustainable model, with author publishing fees being too expensive with the risk that Gold OA means many authors will not be able to publish anymore.
So, how does all this manifest itself in terms of actual OA publishing at the national level? It does of course depend, to an extent, on the existence of mandates. Thus, in Spain, publishing in OA journals is not common, and most ECRs do not publish in them. This is because they do not have enough funds to do so and because they do not trust OA completely, although, they generally trust hybrid journals more. Chinese researchers think similarly, although they did not mention hybrid journals. In Malaysia, ECRs’ choices are constrained by the fact that APCs are only paid for publishing in high IF WoS OA journals. French ECRs do not always have the money to pay APCs. Only those who lead or who are part of funded research projects have APCs paid for them. Research team budgets do not allow for more than that, and ECRs are particularly disadvantaged because they do not lead projects and depend on others to pay the APC for them. UK ECRs are much more positive about OA and depositing papers in IRs but do not necessarily publish more in OA journals. In the OA-‘savvy’ UK, just two ECRs said it impacts their decision where to publish, mentioning that they publish in ‘hybrid’ journals as a consequence.

**Does OA advance or dilute the quality of science?**

The large majority, typically two-thirds of ECRs, feel that OA publishing advances science, but around half of these felt it also has negative consequences. This is the case in the UK, where 18 out of 21 researchers agree with the first part of the statement - that OA helps advance science - and 12 agree with the second, negative statement about dilution. French ECRs are fence sitters, tending to believe that OA advances science but see a risk to science coming from the predatory publishers. Nearly a third of Spanish ECRs also thought the same.

The reasons given for believing OA will advance science tend to be that it is democratic, allowing researchers to read each other’s papers; furnishes easy access to research; and provides them all with the same chance to gain knowledge. Some thought OA was not the issue because quality is more important than the business model, and the real key is the quality of peer review.

**DATA/SOFTWARE**

As Tenopir et al. (2011) state, with science becoming increasingly more data intensive and collaborative, data sharing assumes greater importance. Findings demonstrate that there is a willingness to share data, but in actual fact, only a minority make their data electronically available to others: less than 6% of those who responded to the question on data sharing made all of their data available; 46% reported they made at least some of their data available somehow; and as many reported that they did not make their data available to others at all.

When questioned whether they would like to be recognized more for their data and software and make it more visible (we avoided the term ‘open data’ in case of unfamiliarity), our ECRs also thought highly of the practice but did little about it. They essentially say that they produce data but do not make it available, although many see the benefits of doing so. The case of China is illustrative, where a majority (11) produced data, and one created software. But no one made their data and software available. Five say they will make the data open only if a journal required them to do so. In the case of France, all the ECRs produce data and computer science software. However, only three ECRs (Bio-medics) made their data available when publishing their articles because it was required by the publisher and the peer reviewing process. They did so on PubMed, where you load supplementary data as part of an article.

Many just did not want to provide visibility for, or share, the data. In the case of the French physicists, it was considered a useless exercise to make data open because, as one ECR said, *Nobody would understand the data or would be able to exploit it as they do not have the context of the research, the methodology and so on*. In Spain, only a minority (five) of ECRs produce software, and they think they would have to get credit for it if they are to make it available. A majority (10), however, see benefits in making data more available, but they are mostly unaware of the usefulness of publishing data separately.

In the USA and UK, the use of the word ‘visible’ in the question did not prevent the ECRs understanding the question as about ‘open data’. In the USA, 21 said yes in principle, with only 3 taking a negative view and 4 uncertain. The UK response was similar, with 16 saying yes, 4 being negative, and one response not relevant. There were a number of qualifications in both countries mostly concerned with ‘ethical’ issues (such as human subjects) and confidentiality issues relating to industry. Others, although they answered yes, worried that they would put themselves at a disadvantage if others did not adopt the same open policies.

**Making research findings more widely available**

The question posed was *Would you prefer to make public your research findings in less formal ways, such as blogs, which could make them more visible?* This was really an invitation for ECRs to talk about social media as a publishing medium without being seen to push the social media agenda. The general answer, sometimes defensively put, is that they do not use social media channels for disseminating their research because they lack the time (busy as they are writing papers for high IF journals) and are not given any recognition for these activities (e.g. not admissible on CVs). Other reasons also given are: (1) they lack the know-how; (2) some journals forbid the authors to do so and thus put in peril their all-important papers; (3) there are dangers of misinterpretation, a comment levelled against the media; and (4) dissemination in formal channels is thought to be all important because it is the only guarantee of research quality.

ECRs only confirm the prevailing, if unwritten, norms of academia in feeling the way they do about utilizing social media for research dissemination purposes; as Wolff et al. (2016a, 2016b) find, academics believe that when their work is assessed for appointment, promotion, or research funding, more recognition should be awarded for traditional research publications as
compared to alternative research products. That, of course, is not
to say that ECRs do not want to disseminate more widely and
innovatively, and at least half are tempted or interested in
doing so.

Thus, in France, although no ECR publishes research via
social media channels, a sizeable number (8) say they are tempted
to do so. This intention is related to the original purpose of doing
their PhD, which is to disseminate their research to a larger audi-
ence. For the French and all the other countries, there is a caveat
and that is dissemination should take place after publication in a
peer reviewed journal.

Where social media is encouraged (as it is in the UK by the
REF in order to promote outreach and impact), there are higher
levels of activity, with over one-third giving an unequivocal yes
that they did use social media. Significantly, the drive to use
social media, especially to reach practitioners and policy makers,
appears to be coming from university management, marketing
departments, and - less so - their senior colleagues.

PUBLISHING STRATEGIES

The question asked was *Do you have a conscious publication strat-
egy relating to your research and is that to do with obtaining a
tenured/established position and, if so, please describe?* It was asked
because there was some doubt whether ECRs had a strategy,
something that is thought to be good for their career progression.
In fact, most (three-quarters) ECRs do have a publishing strategy
of sorts, or profess they do. There are, however, variations with,
for instance, nearly all ECRs in China having one but only half in
Malaysia.

Not surprisingly, given the importance accorded to the vol-
ume of papers published in high-ranking journals and the previ-
ous evidence, ECRs overwhelmingly adopt just one strategy and
that is to publish as many articles as they can in high IF journals
because that enhances their reputation and increases the prob-
ability of tenure. A French ECR spoke for many by saying: ‘My
research activity and career progression is only seen through the
prism of publication’.

A small proportion (20% in France) spoke out against such a
strategy, preferring a more qualitative approach, which focuses on
producing fewer, better papers that have a greater impact on the
community. For them, the publish or perish regime was overloading
and harming science. This approach is illustrated by a French com-
puter scientist: *Fundamentally, I do not adhere to the rules, it is
damageable to the scholarly publication system that we publish so
many articles. We could publish less and better articles. We are all in
competition, one against the other and this leads us to publishing even
embryo results. In this competitive race in the past I’ve published arti-
cles that were not mature*. Other alternative, minority publishing
strategies included: obtaining maximum attention; always choosing
the most appropriate journal, not ignoring journals that were pres-
tigious but did not have high JIFs; producing practical and influen-
tial work; obtaining copyright protection for their work; and
balancing high IFs with high readership and speed of publication.

Those who did not have a strategy gave reasons such as
being unfussy, opportunistic, that they ‘operate on automatic
pilot’, that it is too much of a lottery to have one article pub-
lished, and the fact that they so disliked what an ECR from Spain
called the ‘paper engineering’ (salami slicing).

CONCLUSION

ECRs are productive, if not prolific, having published, on average,
10 journal articles and six conference proceedings in their
research careers. Most say their institution and/or their depart-
ment have a formal or informal authorship policy, which largely
concerns who can be named as an author and in what order. Poli-
cies are formal in China and Malaysia and informal in Poland and
Spain, and they can vary by discipline. ECRs voice few complaints
about the policies and are first author in around one-third to one-
half of all the papers to which they contribute. They also have a
significant influence in choosing where a paper is published, with
three-quarters saying this. Choices are, however, constrained by
the fact that most ECRs are part of a research group and their
status in the groups.

When ECRs are in a position to choose or influence where
papers are published, they employ a complex and overlapping
range of criteria, although traditional criteria hold sway, with
being indexed/ranked in WoS or Scopus the most important.
Non-traditional criteria, such as being innovative or open (with
respect to access and peer review), do not count much. As to
making research findings more widely available through social
media and online community platforms, ECRs largely elect not to
do this because they lack the time (busy as they are writing
papers for high IF journals) and are not given any recognition for
these activities. Some would like to, however, if things were dif-
erent or they were in charge.

ECRs think OA publishing is a good idea, but they do not
practice what they believe, unless mandated to do so and, even
then, not all abide by them – depositing papers in IRs is a case in
point. This, again, is all because they are too preoccupied chasing
the high IF journals, which typically are not OA, and because they
obtain no reputational credit for making their publications
OA. Similarly, ECRs produce data but do not make it available,
although many see the benefits of doing so.

Most ECRs profess to having a publishing strategy, but this
strategy boils down to publishing as many articles as they can in
high IF journals because that is what enhances their reputation
and increases the probability of them obtaining tenure. Despite
the siren voices of Science/Web 2.0 for ECRs, it is a case of ‘pub-
lish or perish’.

Finally, ECRs’ room for manoeuvre is limited by the fact that
many work in research groups where the need to consider the
wishes of others whose favours they need to win, are subject to
institutional policies and restrained by the fact that they have to
keep an eye on doing what is best to get them a job (publishing
papers in high IF journals). They are shackled by convention. But
what evidence do we have, then, for thinking that if they were
free and independent, they would do things differently and what things would they do? In fact, many ECRs do not have major problems with the publication-based system they live in and are measured by. This tends to be very much the case for UK and US ECRs. That is not to say they are unaware of the system’s weaknesses because many ECRs emphasize that it is the research itself – and what it tells us – that is important and not any one publication. Nevertheless, they follow the publishing route. Most likely, this indicates that they would much rather have tenure committees and grant-giving bodies actually judge them on the research they have undertaken and not on the basis of what journal they published in. French and Spanish ECRs are the most critical and outspoken, especially regarding their inability to exploit the legion of opportunities there are today for sharing, collaboration, and outreach. French ECRs are particularly critical about the lack of thinking time because they are always struggling to publish, and Spanish ECRs are concerned about the reputational damage of utilizing social media.

Limitations

This study is based on a sample of 116 ECRs and might not be representative of the ECR population as a whole. The ECR profiles with regard to subject, age, gender, age, and whether they are a postdoc/PhD (see Table 1) are very relevant to the interpretation of the results, and analyses from this perspective will be provided as the longitudinal data builds over the next 24 months. The study is also based on personal interpretation of the questions and ECRs willingness to report honestly, knowledgeable, and objectively, all of which may introduce bias.

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