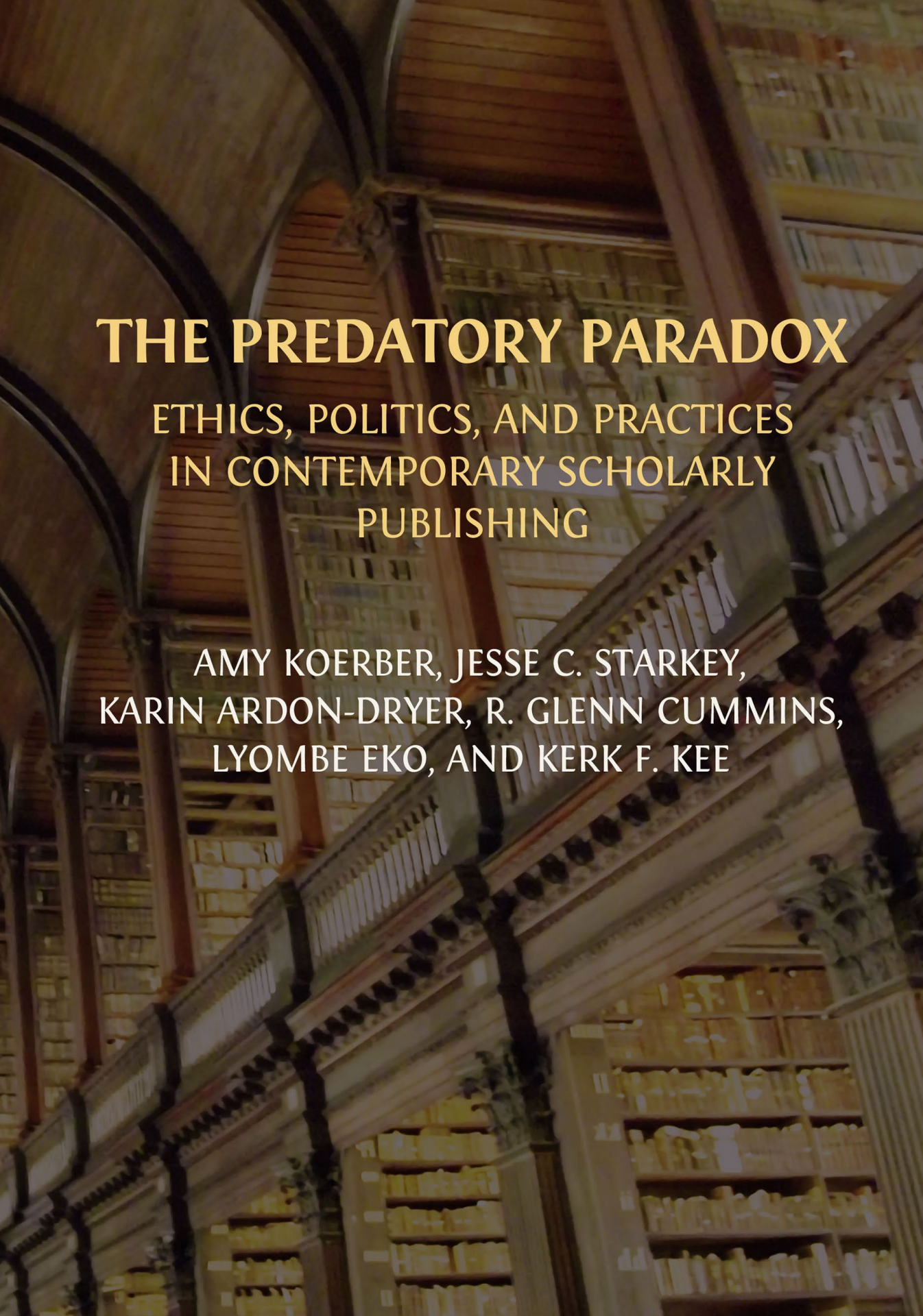

THE PREDATORY PARADOX

ETHICS, POLITICS, AND PRACTICES IN CONTEMPORARY SCHOLARLY PUBLISHING

AMY KOERBER, JESSE C. STARKEY,
KARIN ARDON-DRYER, R. GLENN CUMMINS,
LYOMBE EKO, AND KERK F. KEE

https://www.openbookpublishers.com

ISBN Paperback: 978-1-80511-134-4
ISBN Hardback: 978-1-80511-135-1
ISBN Digital (PDF): 978-1-80511-136-8
ISBN Digital ebook (epub): 978-1-80511-137-5
ISBN XML: 978-1-80511-139-9
ISBN HTML: 978-1-80511-140-5

DOI: 10.11647/OBP.0364

Cover image: Trinity College Library, Dublin, Ireland. Photo by Lyombe Eko (2021), CC BY-NC. Cover design: Jeevanjot Kaur Nagpal

2. Open Science, Open Data
The 'Open' Movement in Scholarly Publishing

Predatory journals are now a global challenge in academic journal publishing. For example, Xia and colleagues (2015) documented that junior researchers from Asia and Africa are among those who have fallen prey to predatory journals. Furthermore, Omobowale and others (2014) revealed that the Nigerian government's requirement for researchers to publish in international journals (i.e., Western and English journals) and the emphasis on quantity of publications (not quality) created the condition for Nigerian researchers to seek publication opportunities in predatory journals. Also, in Turkey, Demir (2018) reported that academic incentives for quantity of publications and researchers' fear of job loss, among other reasons, are what drive some Turkish researchers to submit their work to predatory journals. Perhaps another reason why some Turkish researchers pursue predatory journals is because, as Tutuncu and others (2022) reported, Turkish national journals tend to have an insider bias (about 30% of their publications), making researchers without coauthors in the core networks of journal editors at a disadvantage. Additionally, Shehata and Elgllab (2018) found that the reason some Arab researchers published in predatory journals was because of the ease and speed of publishing their work, compared to traditional academic journals. Moreover, Wallace and Perri (2018) concluded that, based on a sample of 1,284 articles that were included in the Research Papers in Economics archive and published in journals included in Beall's list, in the field of economics, some of the researchers in about ninety countries had published articles in journals that Beall's list characterized as predatory. Iran, the United States, Nigeria, Turkey,

 https://doi.org/10.11647/OBP.0364.03

and Malaysia were listed as among the top five countries.[1] Overall, there are many cases of non-Western researchers in peripheral[2] nations (Wallerstein 1991) publishing their research in predatory journals.

Although the research on predatory publishing experiences often emphasizes non-Western researchers, the reference to the US above reveals that predatory journals are also a challenge among researchers in central nations. Interestingly, some Western researchers from central nations submit their work to predatory journals to inflate their CVs with the motivation to get hired, tenured, and/or promoted. For example, Pond and colleagues (2019) documented that among the forty applicants for a faculty position (i.e., tenure-track Assistant Professor position that requires a PhD) in a pharmacy department in the US, nine (or 22.5% of) applicants had published half or more of their publications in journals identified on Beall's List. In another study, Pyne (2017) reported that the majority of faculty researchers at a small business school in Canada had published their work in predatory journals.

As the literature (e.g., Wallace and Perri 2018; Xia and others 2015) shows, researchers from at least ninety countries, including those from Western cultures such as the US, have submitted their work to journals labeled as predatory. Moreover, the situation is even more challenging because many researchers in the world have also reviewed manuscripts for predatory journals, even while being fully aware that these journals were labeled as predatory (Van Noorden 2020). While some predatory journals do have peer-review processes, their practice is questionable in that they often do not invite reviewers who are the most qualified to review the manuscripts and they allow a very short turnaround window for willing reviewers, which in turn generate minimal revision suggestions for authors to address, compromising the traditional rigor of journal peer review, as discussed in Chapter 1. Also, additional challenges exist in peripheral nations, in that non-Western researchers

1 As we have acknowledged elsewhere in this book, Beall's list was far from perfect. However, as some of the literature discussed in this chapter makes clear, some researchers have used it as an authoritative source of identifying predatory journals.

2 In this chapter we use Wallerstein's (1991) terms 'center' and 'periphery', from his world systems theory, to express the ways in which nations participate in the world economy, based on their level of development. Other scholars have applied these terms similarly when discussing the global politics of scholarly publishing (e.g., Koerber and others 2020; Lillis and Curry 2010).

in these nations are pressured to publish their work in international journals without access to the cultural capital that Western researchers have (Koerber and Graham 2017).

How is the 'open' movement in scholarly publishing relevant to this growing problem? In the previous chapter, we explored the complex relationship that exists between open access and predatory publishing. In this chapter, we continue this exploration, and extend it to include open science. As examined in the previous chapter, open access publishing emerged in the 1990s, taking advantage of digital publication modes to overcome the economic barriers that were preventing many people and institutions across the globe from having access to subscription-only journals. Open science shares the word 'open' and relates in some ways to open access, but with a focus on access to the data behind the research, not just the published research itself. Specifically, open science has been defined as 'the process of making the content and process of producing evidence and claims transparent and accessible to others' (Munafò and others 2017: 5). This definition emphasizes transparency and accessibility as two principles of sharing research content and process that, together, lead to authors making scientific claims with evidence. Moreover, open science has also been defined as science that is practiced with transparency and integrity, and with an emphasis on collaboration and inclusion (Freiling and others 2021).

Even though the terms open science and open access are sometimes used interchangeably, they are two distinct movements. Open access refers to moving the articles beyond paywalls and publishing books and articles in a public fashion so that the research findings can be accessible openly, benefiting researchers as well as the public. In traditional non-open access publishing, the costs of academic publishing are to be borne by the readers and/or their institutions. In open access publishing, the costs by publishers are shifted to the researchers and/or their research funders, or shared among research institutions and other actors. While making the articles and the research findings openly available to the research community and the public has some clear benefits, open access does not address public access to the data behind the findings, thus making it a distinct practice from the core principles advocated by the open science movement.

As we demonstrate in this chapter, 'openness' has a complex relationship with predatory publishing. Although it is often touted as a solution to various problems in scholarly publishing, 'openness' can also create new problems, especially when we consider this complex situation from a global perspective. The chapter begins with an introduction to the basic concepts of open science, including the rationale espoused by its advocates as well as the key principles that readers across the disciplines need to understand about open science. Next, we present a subset of our interview data in which participants offer valuable first-hand insights into the complex relationships that exist among open access, open science, and predatory journals.[3]

A Closer Look at Open Science Principles

Why are the principles of transparency, accessibility, integrity, collaboration, and inclusion important? Are these principles not already upheld in scientific research? Although some would argue that science has been 'open', in principle, since the seventeenth century ('Open Science for the 21st Century' 2020), the recent emphasis on open science is often traced to psychology, as a response to what is now known as the 'replication crisis' (Dienlin and others 2021; Fox and others 2021; Pratt and others 2020). More specifically, in experimental psychology, critics have noticed recently that several landmark studies could not be replicated with similar results by other researchers after the studies had been published (O'Boyle and others 2017; Simmons and others 2011). These incidents called into question the integrity of the published studies, the quality of the research findings, and hence the overall credibility of the scientific enterprise. Given these concerns, advocates for open science began calling for reproducibility, replicability, and generalizability of published research (Dienlin and others 2021) as well

3 Coding to support this chapter's analysis was conducted in an early phase of the project, at a time when the transcripts had not yet been de-identified. Thus, we have not provided a published dataset specific to this chapter. However, readers may access the published dataset for chapter 7, available at https://doi.org/10.18738/T8/3RZARP. This published dataset (see "NVivo file paradox theory 12.26.22.nvp") includes the full text of interview transcripts, de-identified to protect participants' anonymity, although the coding evident in this file was conducted at a later phase of the project.

as transparency and accountability by the researchers (Chauvette and others 2019). These conversations around open science have drawn attention to the research practices that non-transparent and non-accountable researchers have engaged in to compromise reproducibility, replicability, and generalizability of their work.

In a survey to study the prevalence of questionable research practices, Bakker and others (2021: 722) operationalized the practices that may have led to the 'replication crisis' as the following:

1. Collecting more data for a study after first inspecting whether the results are statistically significant.
2. Filling in missing data points without reporting that those data were imputed, e.g., through multiple imputation, mean substitution, etc.
3. Excluding data points, such as outliers, after first checking the impact on statistical significance.
4. Not reporting studies or key variables that failed to reach statistical significance (e.g., $p \leq .05$).
5. Reporting a set of results as the complete set of analyses when other analyses were also conducted but these are not reported.
6. Reporting an unexpected finding or a result from exploratory analysis as having been predicted from the start.
7. Adopting another type of statistical analysis after the analysis initially chosen failed to reach statistical significance. For instance, using OLS instead of logit.
8. Adding or dropping covariates in order to reach statistical significance (e.g., $p \leq .05$) on a key variable.
9. Rounding off a p-value to meet a pre-specified threshold (e.g., reporting $p = .054$ as $p = .05$).[4]

They concluded in the study that many researchers reported having engaged in one or more of these practices, and those who were surveyed

4 As reported in Bakker and others (2021), Table 1: https://doi.org/10.1093/JOC/JQAB031

also believe that while these practices are generally rejected in the scientific community, the practices are prevalent.

Although the recent call for open science is usually traced to psychology, it has echoed across the disciplines. For example, in the field of communication, Dienlin and others (2021) proposed seven recommendations as open science practices that could reduce and/or prevent questionable research practices. Firstly, they suggested publishing research materials, data, and code openly to share with the research community. Secondly, they proposed preregistering studies before the actual research is conducted and submitting registered reports after research completion. Thirdly, they recommended conducting replications of previous studies. Fourthly, they advocated for collaboration with other researchers to increase transparency and early detection of errors. Fifthly, they encourage fostering open science skills as a 'de facto approach' (p. 9) so researchers become familiar and proficient with these practices. Sixthly, they argued for implementing guidelines to demonstrate to the greater research community how to achieve transparency and openness. Finally, they believe in the importance of journal editors incentivizing open science practices to increase the uptake of open science by researchers. Dienlen and others concluded their recommendations with the argument that 'The most important reason to adopt open science practices, however, is epistemic' (p. 20). In other words, they believe that these practices should be the key methods to create knowledge, the main components of the philosophy of knowledge, and the theory of what constitutes scientific knowledge. In the next section, we discuss three of the open science practices from Dienlen and colleagues' discussion that we see as particularly relevant to the issue of predatory publishing: preregistration, open data sharing, and open peer review.

According to open science advocates, open science practices need to be carried out during various points in the research process. For example, preregistration should take place before data collection, whereas open data sharing and open peer review could take place during peer review and after publication. We elaborate on these three practices with more details below.

Preregistration

Among the seven recommendations by Dienlin and others (2021), the practice of preregistration especially needs explanation, as this practice is not always immediately clear to some researchers. Preregistration refers to the official documentation and registry of the hypotheses to be tested, the design of the study, and the plan for data analysis before the data is collected and analyzed (Nosek and others 2018). Preregistration also involves having the documented research plan submitted as a manuscript for peer review, with an introduction to the topic, methodological steps, predetermined sample size from power analyses, as well as any previous results from a pilot study (Dienlin and others 2021).

Once the study is preregistered with a journal, the reviewers and editor can compare the final manuscript with the preregistered study plan to determine if the researchers engaged in any questionable research practices, such as those explicated by Bakker and others (2021). Nosek and others (2015) also explain that preregistration can (a) help others to discover research (published and unpublished) when it is entered into a public registry, and (b) verify the difference between confirmatory and exploratory research, also known as 'hypothesis-testing versus hypothesis-generating research' (p. 3). At the heart of preregistration is the rationale of having a gatekeeping mechanism to prevent questionable research practices that escape the peer-review process, leading to more replication crises after publications.

Furthermore, through the practice of preregistration, studies with sound methodology which turn out to have null results should not be rejected simply because they do not reach statistical significance. Supporters of open science principles in general, and preregistration specifically, argue that registering a study with a journal and conducting methodologically sound research will help address the replication crisis by forcing journals and editors to look at the quality of the science, rather than the statistical significance of the results (Fraser and others 2018). To that end, many believe that open science practices such as preregistration can help address the issue of predatory publishing by reducing the chances that authors will feel pressured to submit to sub-par journals as a way to put research without statistical significance into circulation.

Open Data Sharing

The second practice is that of open data sharing (Morey and others 2015). By openly sharing research data along with a manuscript submitted to a journal, the researchers allow future readers to re-examine the reported findings using the associated dataset, thus further increasing the transparency of the data analysis leading to the findings. Pusic (2014) contends that data sharing can facilitate the re-analysis of open data that could allow new conclusions and interpretations not initially included in the original manuscript. Similarly, Chauvette and others (2019) add that data sharing can help future readers build upon original data, offer critiques of the reported data analysis, validate research findings, and test new and emerging theories. In other words, collaboration with and inclusion of future readers in the research process are made possible through open data sharing.

Furthermore, Morey and others (2015) take open data sharing to the next level by suggesting that researchers can share their research data with the reviewers during the review process. This level of openness allows reviewers the opportunity to interrogate the research and verify the findings during the peer-review process to assess the integrity, rigor, and quality of the submitted research manuscript. In other words, as early as the peer-review process, the practice of data sharing can serve as another gatekeeping mechanism to filter out research findings with questionable practices. McGrath and Nilsonne (2018) maintain that open data sharing can serve three main purposes: enabling critical scrutiny (by both the reviewers and future readers), facilitating cumulative science (by allowing future readers to add to the original dataset for analyses of an even bigger dataset), and allowing re-use of data (by making the data available permanently). While the connection between open data and predatory publishing may not be as clear cut as the other components of open science explored in this chapter, it can be argued that making data sets open protects against various forms of research fraud by allowing readers to directly assess the quality of the research, without relying exclusively on the opinions of blind peer reviewers to ensure research quality.

Open Peer Review

The practice of peer review before an article is published dates back to 1665 (Longley Arthur and Hearn 2021). The traditional form of peer review is double blind (meaning both the authors and the reviewers are anonymous to each other) for two reasons. Firstly, if the reviewers do not know the authors, the reviewers can provide the most rigorous reviews based solely on the content of the manuscript, without being biased by any prior knowledge of the reputation of the authors and/or relationships with the authors. Secondly, the identity of the reviewers will be unknown to the authors, allowing the reviewers to provide the most honest reviews, without concerns about any possible backlash. Therefore, double-blind peer review was designed to be a rigorous method of assessing the legitimacy of ideas being presented in a research manuscript and providing suggestions for improvement to the manuscript before it is formally printed and disseminated to the broader research community (Moed and others 1985). As Pratt and others (2020) argued, 'Journals are central gatekeepers to the field and, of course, have the responsibility to keep poorly conducted research from being published' (p. 12).

However, double-blind peer review as a practice has also received criticisms, such as questions about the selection of reviewers, including their credibility and accountability. The blind nature of traditional peer review can be a problem when some reviewers provide weak, unfair, harsh, and/or careless reviews because they know that their identities will not be known to anyone other than the editor (Ferguson and others 2014). Furthermore, traditional peer review operates much like a 'black box' that occurs behind closed doors. Readers have trusted double-blind peer review for many centuries as the gold standard that ensures the quality of scientific knowledge. However, most of the time, in the way peer review traditionally operates, the readers of a scientific article must simply trust on blind faith that reviews are taking place. In response, some advocates for open science principles also propose the practice of open peer review.

For example, open review has been referred to as 'a major pillar of Open Science' (Ross-Hellauer 2017: 1). As its name suggests, open review refers to practicing openness and transparency during the

peer review process. Nosek and Bar-Anan (2012) explain that the goal of open review is to make the evaluation and assessment of research transparent and public rather than closed and private. According to Fox and others (2021), what constitutes open peer review varies from one advocate to another in the open science movement, but in general there are four layers: open identities, open reports, open prereview, and open final-version commenting.

Firstly, the practice of open identities allows authors and reviewers to be openly known to each other. Moreover, peer reviews are published together with the articles reviewed, thus ensuring fairness and collegiality. Secondly, the practice of open reports entails recognizing good reviewers, helping them earn recognition for their fair and collegial critique, and potentially even garner citations. The practice of open reports could provide the missing incentives for reviewers to provide more thorough reviews. Thirdly, open prereview leverages the 'wisdom of the crowd' through a Yelp-like platform to allow any reader to review a manuscript before publication. The cumulative score given to a manuscript can be openly displayed to the public on the crowd-sourcing platform. Fourthly, open final-version commenting allows the public, including researchers, readers, citizen scientists, and others to comment on published manuscripts. Given its open nature, the authors of the articles are expected to respond to the comments and engage with the public in open communication about science even long after the manuscript is published. All the layers of open peer review could be powerful tools to help combat predatory publishing, especially since one of the primary issues surrounding predatory journals is a *lack* of peer review of any sort.

Through removing the review process from the 'black box' of blind or double-blind reviews, open peer reviews could potentially help combat predatory publishing in two main ways. Firstly, researchers who are considering submitting to a specific journal could examine some of their published articles and the accompanying reviews to confirm whether sufficiently rigorous reviews were being conducted. Secondly, and perhaps more importantly, opening the review process may remove some of the fear and anxiety junior researchers feel when they consider submitting their work to an academic journal. As discussed in Chapter 3, one reason researchers may turn to predatory journals is because they

are afraid of the review process. It could be argued that if the process and results of peer review were more transparent, some of that fear would be removed, and authors might be less likely to turn to predatory journals out of fear of being harshly judged by their peers during the review process.

Given these arguments, open science principles are often touted as an antidote to the questionable research practices and the 'replication crisis' advocates seek to address. However, as explored in the next section, our interview participants' insights into the concept of openness in scholarly publishing also suggest some of the limitations that we may face in implementing open research practices.

Open Science, Open Access, and Predatory Publishing: A Complex Relationship

With these various meanings of 'openness' in scholarly publishing as a backdrop, in this section we explore how some of our interview participants understand open access, open science, and how these concepts relate to predatory publishing in their experiences. The stories our participants tell about falling victim to predatory journals, along with their lack of awareness of open science, misunderstanding of open science, and confusion about the relationship between open science and open access, further illustrate the complexity of this situation.

Stories of Falling Prey to Predatory Journals: The Complexity of 'Open'

As discussed earlier in this chapter, scientific openness in the open science movement mainly referred to the open sharing of research data, supporting analytic code, and materials such as, for example, survey items, stimulus materials, and experiment programs. It does not include publishing articles via an open access route. In fact, the Center for Open Science featured a blog post in 2020 arguing that open science and open access are in conflict with each other: Open access incentivizes publishing as much content as possible, regardless of quality, because the publisher stands to gain financially through article processing charges (Mellor and others 2020). Open science, by contrast, aims to increase the quality

of published research by making the data behind a publication fully accessible to readers. In an argument that may seem counter-intuitive, the authors then present preprints as a possible solution:

> With preprinting, publishing is a relatively trivial act. Authors need only meet modest moderation criteria for their preferred preprint service. When most anything can be published, publication recedes as the key incentive. What takes its place? Evaluation. Journals have historically confounded publication with evaluation. If the paper meets the evaluation criteria, then it is published. Therefore, publication is the act that signals credibility for authors' work and evaluation — peer review — is an impediment to achieving that reward.
>
> Preprinting separates publication from evaluation. Publication itself no longer signals credibility. If publication doesn't signal credibility, then peer review is no longer a barrier for authors to overcome to get the reward of publication. Peer review becomes a service authors need to achieve credibility. (Mellor and others 2020: 5–6)

As this example makes clear, the concept of openness in scholarly publishing is more complex than it might first appear. However, some of the major aspirations for openness in the academic community are clear: to address the 'replication crisis' and a myriad of related problems that are perceived in scholarly publishing today.

In our interviews with stakeholders in scholarly publishing, openness was sometimes mentioned as an antidote to predatory publishing. For example, some interviewees observed that predatory publishing has been able to thrive because much of academic publishing occurs in a black box, behind closed doors, during the blind peer-review process. These practices allow predatory publishing to thrive because they make it possible for a journal to broadly advertise itself as a quality research outlet that practices double-blind peer review but then to publish articles without actually putting them through the peer-review process. Open access also has a complicated relationship with predatory publishing. Over the years, some have argued that predatory publishing exists because of open access publishing (Beall 2012), and as a result, to some extent, open access journals have been demonized and wrongly understood as predatory just because they charge authors a publication fee (Beall 2013).

Through the perspectives of our interviewees, we gained some valuable insights into these complex relationships between open science,

open access, and predatory publishing and how these relationships play out in the daily realities of stakeholders in scholarly publishing. As revealed through the insights of several participants, the unethical and unprofessional methods, deceptive means and objectives of predatory journals have been prejudicial to the integrity of academic journal publishing. For example, when asked if he had personal experiences with predatory journals, a participant in Southeast Asia revealed,

> I had, actually. I was the coauthor. My colleague put my name [on the paper…] Suddenly I saw my name is there [in name of the predatory journal]. And when I asked my colleague – Why you sent it? – And she paid [the APC…] I said – Why you're doing this? You should ask me first step. (P39)[5]

The participant actually was aware of predatory journals. However, he became a victim due to the choice of his coauthor. In other words, predatory journals can pose a challenge even to those who are aware of the phenomenon. A communication researcher from South America recounted a particularly compelling example:

> I have one sad story […] It was four years ago […a colleague] she was an assistant professor […] And she had this very good article that somehow, she thought she had submitted it to the International Journal of Communication, IJOC […] She didn't tell anyone. We only learn after the fact. Again, junior professor, inexperienced. She [said], 'I have my article. I received a special call […] It's going to be […]' And the name of the predatory journal, I don't remember exactly the name. But it was very similar to the IJOC […] So she submitted her article and the article was published next month […Then] they asked her to pay processing fees, because it was open access and whatnot […] At the time I was her tutor. So she said, 'Hey, I received this thing, but it's open access. So I understand being open access, processing fees.' And I said, 'Yeah, I know. It's expensive. So what's the name of the journal?' 'It's the IJOC.' And I said, 'IJOC is open access [but] it doesn't charge […] So that's when she showed me the journal and I said, 'This is not the IJOC' […] So of course, a big shock to her […] she lost the manuscript. Because then she asks the journal to [retract] the article, and of course they didn't

5 Our Texas Data Repository Dataverse includes a table showing participant demographic information. See https://doi.org/10.18738/T8/QUBMLI ("Participant Occupation and Regional Demographics Table"). All quotations from interviews are reported without correction of grammatical errors or other irregularities. Some quotes were abbreviated using […] to achieve clarity of the original message.

> do that [...] because it looks prestigious to have someone from a decent school publish in there. And she [didn't] know where to turn to. (P47)

This story demonstrates that predatory journals can confuse seemingly informed researchers, even in academic departments where colleagues have a greater understanding of predatory journals. It signals to us not to underestimate the scope of the ethical problems posed by the deceptive practices of predatory journals. It also demonstrates that in the event an author refuses to pay, the predatory journal still gains a paper to make their journal look more 'gray' and/or legitimate.

Falling prey to predatory journals was also reported by STEM researchers we interviewed. For example, an environmental chemistry researcher in East Asia commented on his experience as a master's student: 'I submitted [my paper...] The following morning, I [got] an email saying my paper has been accepted. No review, comments, nothing and I was now asked to pay [...] at that time it was US$150' (P10). This was his very first journal submission, so he did not question the quick acceptance notice and the request for payment. He continued, 'The funny thing is the paper I had coauthored with some senior researchers, and they never said anything, they just gave me the $150 and I paid.' Surprisingly, the quick acceptance and payment request did not raise questions with his senior collaborators, and they complied with making the payment.

The same participant went on to narrate an experience during his PhD training: 'My supervisor [...] had a list of journals that he recommended for us to publish. So when I submitted, I waited [...] for a month, then came the reviewer comments from [...] three different reviewers commenting on the work.' What the participant received was a surprise to him, as he said, 'This is totally different to what I had experienced [...] I started doing more research with what was really going on [...] Then I saw the journal that I had published was mentioned on Beall's list.' The participant concluded his story, 'I didn't know that it was predatory journal until I tried to publish my first work as a PhD candidate. That's when I realized — Oh, I submitted my first paper [to] a predatory journal!' This story demonstrates how junior researchers, especially graduate students, are prone to falling prey to predatory journals. They do not have knowledge and experience to recognize that receiving no reviews is unusual, even when coauthoring with senior researchers.

These experiences demonstrate some of the ways in which predatory journals can undermine the ethics and integrity of the academic journal publishing enterprise.

As these stories make clear, researchers do fall prey to predatory journals. So how can these incidents be explained? Our data tell us three reasons, which collectively suggest the confusion and conflation between open science and open access. Firstly, we observed that there is a lack of awareness of open science in the research community. For example, a participant in East Asia admitted, 'I don't have a very clear definitions about what the open science movement's about' (P46). Another participant in Southeast Asia also stated, 'I'm actually not very familiar with it' (P41). A noticeable portion of our interview participants directly stated that they did not know or know much about open science. This finding from our data resonates with Bakker and others (2021), when they reported that many researchers in their study expressed being unfamiliar with what constitutes open science practices.

Furthermore, a librarian in South Asia observed that there is a lack of awareness of open science outside of the Western world: '[E]xcept a few countries in Europe and US, this issue of open science has not been very well discussed [...] In [my country], there is few discussion, but we never able to have any kind of forum which promote open science' (P17). Also, a participant in North America, who is the editor of a highly reputable journal, suggested that open science may not be relevant to non-STEM disciplines, such as social sciences and humanities: 'I think it's [open science] more on the hard sciences' (P33). We understand that open science advocates are working to raise awareness and establish relevance. It may simply be a matter of time before the research community becomes aware of open science and recognizes its relevance. Yet, even for those that had heard of it, confusion about open science is common.

Secondly, among those who have heard of the open science movement, we observed confusion about the distinction between open science and open access. Although open science and open access are distinct by definition, we observed that the two movements are often collapsed in the way participants talked about them. For example, a participant in Western Europe explained, 'So open science would include [...] preregistrations, publishing materials openly, but also publishing

the papers with unrestricted access' (P38). Unrestricted or open access publishing is discussed because participants want their peers to be able to read and cite their work easily. For example, a publishing professional in North America observed, 'I think most people who talk about open access also extend it to other kinds of open science, including data, as a research output' (P25). A journal editor in Western Europe commented, 'The ultimate goal would be open science, and open access is [...an] important part of open science, where open science means, really, open communication, including communicating your results' (P36). In these examples, we observed that participants naturally conflate open science and open access. But open access does not address the replication crisis, which is a key motivation behind open science.

Thirdly, participants also discussed their confusion surrounding open science. For example, a participant in North America shared, '[S]omeone in my field [...] championing open science [...] used the term preregistering [...] left me really baffled' (P37). This excerpt suggests that key terms in open science, such as preregistering, can be confusing for the target audience. He continued, '[...] these are just not things in my vernacular.' This finding resonates with Bakker and others (2021), as they reported that 'when discussing preregistration, as many as 26% (71/268) indicate that they or their colleagues were unfamiliar with the concept' (p. 730).

While open science advocates may argue for the need to further educate the target audience, our research suggests this may be an uphill battle. This is because many readers may already have a different understanding of key words such as 'preregister'. As one participant revealed, 'To me preregistering means like registering for a conference' (P37). Certain terminologies within open science may impede its diffusion given how certain key words such 'preregister' are not commonly used as intended by open science advocates, and this lack of understanding presents a ripe opportunity for predatory journals to exploit researchers by similarly offering opportunities to preregister manuscripts. Moreover, this participant hints at some perceived overlaps and confusion about the relationship between open science and open access, which are some of the main concerns raised in this chapter.

On a related note, when we asked participants about the open science movement, which includes a push for more preprint publications,

much of the discussion surrounding these repositories of unreviewed scholarly manuscripts centered on the challenges preprints may introduce to the scholarly knowledge production world, rather than its benefits. A challenge one participant voiced was that preprints were being used by authors as a way to avoid lengthy peer review processes (P22). Another perspective was the difficulty faced by indexing services about how to track publications as they are posted on preprint servers, given DOIs, submitted to journals, peer reviewed, and then potentially published in a journal after rounds of revision (P22). However, the bulk of participants who viewed preprints as a potential challenge to the knowledge production process were concerned with the notion that 'people don't differentiate between peer-reviewed publications and what appears on preprint service, you know?' (P23). Due to general audiences potentially not understanding the importance of peer review, there was a fear that reliance on science in preprints 'could lead to bad decisions being made' (P11), such as in the early days of the COVID-19 pandemic, when virus origin theories, posted on preprint servers, made their way into mainstream media outlets (P20). However, an interesting nuance to the discussion surrounding preprints was the speculation that preprints might be a solution to predatory journals,

> [...] because you can get your data out there and you can cite that in your grant requests or whatever else you need. It's transparent but it's not peer-reviewed and it's enduring unlike a predatory journal that might disappear tomorrow. At least you know the preprint server will be enduring. (P28)

This idea was expounded by another participant who noted that 'You can't say on the one hand that preprints are great, and the other hand say that everything in the predatory journals is trash' (P15) because from their perspective, if peer review was held as the gold standard for ensuring quality, what was the actual difference between predatory journals and preprint servers? From this perspective, preprints exemplify the paradox facing academic researchers in the modern publishing environment — do they serve the purpose of disseminating scientific knowledge in a timely manner, or do they threaten the credibility of scientific research by removing the gatekeeping function of peer review?

Conclusion

This chapter first discussed what constitutes open science and the origin of the open science movement as a response to the 'replication crisis' in psychology. Secondly, we explained three important open science practices, namely preregistration, open data sharing, and open peer review. Thirdly, we provided evidence to show that it may be easy for Western researchers to minimize the threat of predatory journals in the global context, but that threat is real. Specifically, we presented evidence of the prevalence of predatory journals in both the Western and peripheral nations through a literature review, as well as evidence from our interviews of how the push for open science can accidentally help predatory journals to thrive when many researchers around the world conflate open science and open access. When considered in this global context, rather than exclusively from a Western perspective, the limitations of seeing open science as an antidote to predatory publishing become clearer. For those scholars who do not have access to the infrastructure that makes data sharing possible, or who do not have adequate knowledge of open access, open science, and the relationships between them, open science does not necessarily serve as the remedy to predatory publishing that some Western scholars proclaim it to be. Through the stories of our participants, we see that the threat posed by predatory journals has real-world impact on scholars across the globe and that open science may not always be the foolproof antidote.

What are the implications for open science? Firstly, even if open science advocates can articulate how it is different from open access, many of the systemic conditions that led to the predatory journal problems remain. For example, our research (as reported here and emphasized in other chapters of this volume) revealed a lack of awareness, pressure to publish, and most importantly, global disparities related to these factors. Thus, open science advocates would be wise to consider how the open science movement can thrive and succeed under the same set of conditions that has made open access an easy victim of predatory journals. They must be acutely mindful of these global structures that have given rise to predatory journals. One possible means of safeguarding open science is to follow the suggestions set forth by the International Science Council in 2020. In their working paper, they lay

out an argument for open science that positions practices of openness as necessary for the public good, while simultaneously addressing challenges related to equitable access to information, especially in terms of national and institutional abilities to pay for their researchers to access global information repositories that are housed behind paywalls ('Open Science for the 21st Century' 2020).

Secondly, the notion of openness advocated by the open access movement has been used and abused as a deceptive tool by predatory journals. Furthermore, some participants in our study also talked about open science and open access as related or synonymous. Given this confusion, open science advocates should be actively concerned about the possibility of open science becoming victimized by predatory journals in due time, if nothing intentional is done to preemptively safeguard the open science movement. One possible solution could be an open science training program adaptable to the socio-cultural-political complexity of central and peripheral nations. However, as shown in Chapter 6 of this volume, there are numerous freely accessible information repositories aimed at increasing knowledge related to scholarly publishing ethics, open access, and open science — yet they are largely underutilized. Alternatively, if open science policies are adopted at the national or institutional levels, the cultural shift toward and knowledge of open science practices may gain more momentum than if left up to individual researchers or disciplines.

Thirdly, the literature review suggests that some researchers knowingly publish in predatory journals in order to inflate their CV. Given this phenomenon, we argue that this culture of deception may have always been there. Predatory journals simply provide another venue for it to manifest. If the latter is the case, the open science practices of preregistration, open data sharing, etc., will only address the symptoms, but not the root cause of the replication crisis. However, for authors who are guided by ethical principles, open science practices will assist in distinguishing between publications that were produced following accepted scientific processes and those that were not. Furthermore, as more journals move toward adopting open science principles and requiring authors to submit their data for review alongside their manuscripts, it may become more difficult for deceptive practices to make their way into the scientific record.

Fourthly, we ('we' in the broadest sense to reflect those of us in the academy) need to stop assuming a media-literate body of researchers. Given the proliferation of predatory journals, and the lack of awareness of such journals documented in our interviews, there will be greater numbers of graduate students who do not understand quality versus suspect research, and who do not know how to adequately vet information they find. How is open science addressing this emerging trend? While students who work with prominent researchers receive informal mentoring that would protect them from predatory journals, such mentoring/education is too often assumed and/or implicit. Our fear is that when we encourage informal guidance, we assume it is happening. The gravity of this concern necessitates that we encourage more formal discussion of this topic in an explicit fashion for graduate students through coursework, education of junior faculty through mentorships, annual reviews, and the like. Mentors, along with an overall institutional culture that encourages and supports ethical and open research practices can help address this issue, as is shown in Chapter 5 of this volume.

Fifthly, and related to our last point above, open science advocates should note that the time it takes for most researchers to publish in traditional journals creates graduation and career barriers for junior researchers, especially those in the peripheral nations. If open science is to add additional layers to the publication process in a fashion that would further complicate the publication timeline, we worry the movement will not receive much support, especially among the next generation of researchers, who will likely experience such practices as barriers to their participation in the research community. Open science advocates would be wise to ask: Who are we pushing out by upholding certain open science standards, especially those among the next generation of researchers? Along these lines, we discovered during the course of this project exactly how time consuming it can be to implement open science principles. When we decided to make our qualitative dataset available in the Texas Data Repository, we first had to comb through all forty-eight transcripts to remove any information that could potentially lead a participant to be identified. This was not a simple matter of using a search and replace command, but rather, required line-by-line reading of each transcript to remove any text that could possibly have this result.

Our team was able to complete this task because we had grant support to pay a research assistant to do the work, but if we had been operating with fewer resources, it would not have been possible to complete this work, and thus, we would not have been able to implement open science principles for this project.

Our last concern is that reviewers, editors, or readers might begin using open science practices such as preregistration and open data sharing as heuristics for high quality. In other words, the culture surrounding open science may begin to suggest that for research to be considered high quality, it must be open, and that data must be made available for public scrutiny. If so, what are the implications for research data that cannot be made available, due to the socio-political-cultural complexity of certain peripheral nations? To what degree would such a practice create a wider gap between the Western (central-nation) and non-Western (peripheral-nation) researchers?

On this note, we would like to end the chapter with a quote from Markowitz and others (2021), 'The absence of open science does not guarantee bad science, nor its mere presence guarantee good science' (p. 758). Although sharing materials can be considered a necessary condition for high quality, it is not a sufficient one. This quote is important as we consider what the 'quality' of scientific research is: the topic of the next chapter.

Key Takeaways

- The recent emphasis on open science has been a response to the 'replication' crisis, first examined in psychology, when critics noted that several seminal studies in experimental psychology could not be replicated.
- The key components of open science are reproducibility, replicability, and generalizability of published research.
- Three open science practices that can help combat predatory publishing are preregistration, open data sharing, and open peer review.
- The practice of preregistration refers to the official documentation and registry of the hypotheses for testing, the design of the study, and the plan for data analysis before the data is collected and analyzed.
- Open data sharing is the practice of sharing research data along with a manuscript submitted to a journal, thus allowing future readers to re-examine the data, increasing the transparency of the study, and encouraging replication.
- Open peer review refers to practicing openness and transparency during the peer-review process, which could take place in four layers: open identities, open reports, open prereview, and open final-version commenting (Fox and others 2021).
- Despite being separate movements, there is misunderstanding and confusion between the principles of open science and open access.

Discussion Questions

1. Why are the principles of transparency, accessibility, integrity, collaboration, and inclusion important?
2. Are these principles not already upheld in scientific research?
3. What might be factors that compel researchers not to be transparent or accountable about the methods and results of their work? (NB: some of the ideas that may come up in discussions could be linked to Chapter 3 of this volume and the themes that emerge as 'challenges to quality'.)
4. What might be some barriers to researchers adopting preregistration as a regular practice in their work?
5. What are some potential challenges of open data sharing that may make some researchers feel the practice is not applicable to their work? (NB: We're specifically thinking about qualitative researchers and their datasets — through our experience with making our data set open, we discovered a range of challenges qualitative researchers face, as opposed to quantitative researchers and their associated types of data.)

Activities

Activity One: Preregistration Exercise

1. Have the class search for journals in their field that have options for preregistration. Compile the list and share with faculty and graduate students to encourage participation in study preregistration.
2. Have students seek out faculty (they could simply ask their advisors or mentors in the department) and interview/survey them about preregistration and whether they have used it or would consider using it. If the class finds that most faculty in their program/department/college do not use (or have never heard of) preregistration, the class could present the topic at a faculty brownbag or another similar venue (and they can share their list of journals that offer preregistration in their field).

Activity Two: Open Data Sharing in Qualitative Research

This activity is intended to help junior researchers examine the complexities of implementing open data sharing with qualitative research. This could be a good activity for a qualitative methodology or data analysis class. Our team gave a presentation on the challenges of making a qualitative data set open. You may view the slides online.[6] Alternatively, have the class use a qualitative data set they are familiar with, and base the following discussion questions on their dataset:

- Why should we care about open science in the context of qualitative research?
- How do we implement open science principles in qualitative research?
- What challenges will we face in implementing open science for qualitative research?

6 https://doi.org/10.11647/OBP.0364#resources

- Discuss the benefits and complications of open data and qualitative research (the resource linked above lists some of them and includes citations).
- Below is an image of the attributes we collected from participants, and a snippet of interview transcript that had some identifying information that had to be removed to protect the identity of the participant.
- Using the images below as a starting place, have the class discuss the challenges of ensuring participant confidentiality, specifically in terms of the 'complications' offered by the resource slides linked in the activity introduction.

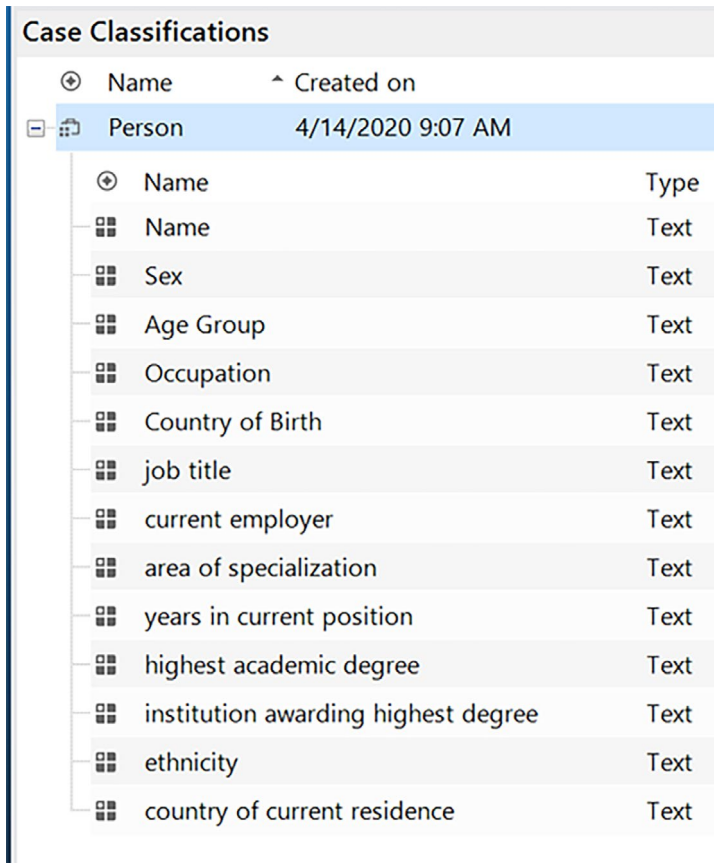

Fig. 2.1 STEPP Research Team, *Case Classifications Example* (2020). © STEPP Research Team

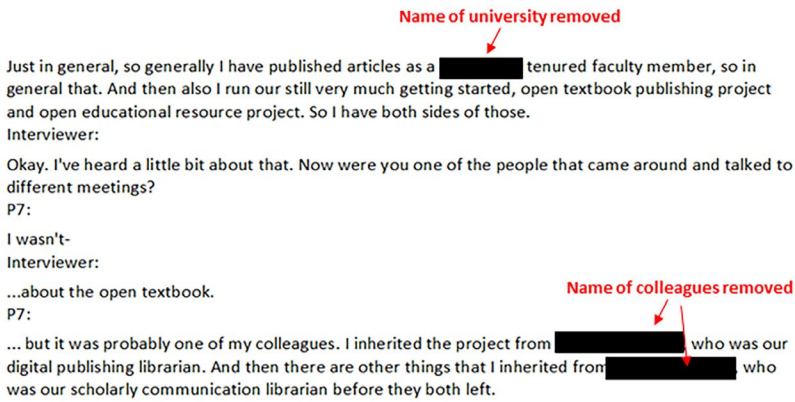

Fig. 2.2 STEPP Research Team, *Transcript Deidentification Example* (2020). © STEPP Research Team

Activity Three: Worst-Case Scenario: Predatory Journals Hijacking Open Science Principles

Imagine this scenario: You are a researcher looking for a journal to publish your latest manuscript. You find a perfect one — and they are asking for the dataset to be submitted as well, as an indicator of adherence to principles of open science. You agree and submit the manuscript along with the dataset. Months later, you see a published article that seems to be using data identical to yours… yet you have not heard anything from the journal about acceptance or revisions. You attempt to reach out to the journal and receive no response. You reach out to the author of the manuscript you suspect is using your data set, asking them where they gathered their data. They reply that they purchased it from a database of raw data, supplied by the journal. You now suspect that the journal stole your data and sold it to another researcher.

- What can you do?
- Is this a potentially realistic scenario?
- What measures could authors take to ensure something like this could not happen?

References

Bakker, Bert N., Jaidka, Kokil., Dörr, Timothy., Fasching, Neil and Lelkes, Yphtach. 2021. 'Questionable and Open Research Practices: Attitudes and Perceptions among Quantitative Communication Researchers', *Journal of Communication*, 71.5: 715–38, https://doi.org/10.1093/JOC/JQAB031

Beall, Jeffrey. 2012. 'Predatory Publishers Are Corrupting Open Access', *Nature*, 489.7415: 179, https://doi.org/10.1038/489179a

——. 2013. 'The Open-Access Movement Is Not Really About Open Access', *TripleC: Communication, Capitalism & Critique*, 11.2: 589–97, https://doi.org/10.31269/TRIPLEC.V11I2.525

Chauvette, Amelia., Schick-Makaroff, Kara and Molzahn, Anita E. 2019. 'Open Data in Qualitative Research', *International Journal of Qualitative Methods*, 18: 1–6, https://doi.org/10.1177/1609406918823863

Demir, Selcuk Besir. 2018. 'Predatory Journals: Who Publishes in Them and Why?', *Journal of Informetrics*, 12.4: 1296–311, https://doi.org/10.1016/j.joi.2018.10.008

Dienlin, Tobias., Johannes, Niklas., Bowman, Nicholas David., Masur, Philipp K., Engesser, Sven and others. 2021. 'An Agenda for Open Science in Communication', *Journal of Communication*, 71.1: 1–26, https://doi.org/10.1093/joc/jqz052

Ferguson, Cat., Marcus, Adam and Oransky, Ivan. 2014. 'Publishing: The Peer-Review Scam', *Nature*, 515.7528: 480–82, https://doi.org/10.1038/515480A

Fox, Jesse., Pearce, Katy E., Massanari, Adrienne L., Riles, Julius Matthew., Szulc, Łukasz and others. 2021. 'Open Science, Closed Doors? Countering Marginalization through an Agenda for Ethical, Inclusive Research in Communication', *Journal of Communication*, 71.5: 764–84, https://doi.org/10.1093/JOC/JQAB029

Fraser, Hannah., Parker, Tim., Nakagawa, Shinichi., Barnett, Ashley and Fidler, Fiona. 2018. 'Questionable Research Practices in Ecology and Evolution', *PLOS ONE*, 13.7: e0200303, https://doi.org/10.1371/journal.pone.0200303

Freiling, Isabelle., Krause, Nicole M., Scheufele, Dietram A. and Chen, Kaiping. 2021. 'The Science of Open (Communication) Science: Toward an Evidence-Driven Understanding of Quality Criteria in Communication Research', *Journal of Communication*, 71.5: 686–714, https://doi.org/10.1093/JOC/JQAB032

Koerber, Amy and Graham, Hilary. 2017. 'Theorizing the Value of English Proficiency in Cross-Cultural Rhetorics of Health and Medicine: A Qualitative Study', *Journal of Business and Technical Communication*, 31.1: 63–93, https://doi.org/10.1177/1050651916667533

Koerber, Amy., Starkey, Jesse C., Ardon-Dryer, Karin., Cummins, R. Glenn., Eko, Lyombe and others. 2020. 'A Qualitative Content Analysis of Watchlists vs Safelists: How Do They Address the Issue of Predatory Publishing?', *Journal of Academic Librarianship*, 46.6, https://doi.org/10.1016/j.acalib.2020.102236

Lillis, Theresa and Curry, Mary Jane. 2010. *Academic Writing in a Global Context: The Politics and Practices of Publishing in English* (New York: Routledge)

Longley Arthur, Paul and Hearn, Lydia. 2021. 'Toward Open Research: A Narrative Review of the Challenges and Opportunities for Open Humanities', *Journal of Communication*, 71.5: 827–53, https://doi.org/10.1093/JOC/JQAB028

Markowitz, David M., Song, Hyunjin and Hardman Taylor, Samuel. 2021. 'Tracing the Adoption and Effects of Open Science in Communication Research', *Journal of Communication*, 71.5: 739–63, https://doi.org/10.1093/JOC/JQAB030

McGrath, Cormac and Nilsonne, Gustav. 2018. 'Data Sharing in Qualitative Research: Opportunities and Concerns', *MedEdPublish*, 7.255 (F1000 Research Ltd): 1–12, https://doi.org/10.15694/MEP.2018.0000255.1

Mellor, David T., Nosek, Brian A. and Pfeiffer, Nicole. 2020. 'Conflict between Open Access and Open Science: APCs Are a Key Part of the Problem, Preprints Are a Key Part of the Solution', *Center for Open Science Blog*, https://www.cos.io/blog/conflict-between-open-access-and-open-science-apcs-are-key-part-problem-preprints-are-key-part-solution

Moed, H. F., Burger, W. J.M., Frankfort, J. G. and Van Raan, A. F.J. 1985. 'The Use of Bibliometric Data for the Measurement of University Research Performance', *Research Policy*, 14.3: 131–49, https://doi.org/10.1016/0048-7333(85)90012-5

Morey, Richard D., Chambers, Christopher D., Etchells, Peter J., Harris, Christine R., Hoekstra, Rink, and others. 2016. 'The Peer Reviewers' Openness Initiative: Incentivizing Open Research Practices through Peer Review', *Royal Society Open Science*, 3.1: 1–7, https://doi.org/10.1098/RSOS.150547

Munafò, Marcus R., Nosek, Brian A., Bishop, Dorothy V.M., Button, Katherine S., Chambers, Christopher D. and others. 2017. 'A Manifesto for Reproducible Science', *Nature Human Behaviour*, 1: 1–9, https://doi.org/10.1038/s41562-016-0021

Nosek, Brian A., Alter, G., Banks, G. C., Borsboom, D., Bowman, S. D. and others. 2015. 'Promoting an Open Research Culture', *Science*, 348.6242: 1422–25, https://doi.org/10.1126/SCIENCE.AAB2374

Nosek, Brian A. and Bar-Anan, Yoav. 2012. 'Scientific Utopia: I. Opening Scientific Communication', *Psychological Inquiry*, 23.3: 217–43, https://doi.org/10.1080/1047840X.2012.692215

Nosek, Brian A., Ebersole, Charles R., DeHaven, Alexander C., and Mellor, David T. 2018. 'The Preregistration Revolution', *Proceedings of the National Academy of Sciences*, 115.11: 2600–06, https://doi.org/10.1073/PNAS.1708274114

O'Boyle, Ernest Hugh., Banks, George Christopher., and Gonzalez-Mulé, Erik. 2017. 'The Chrysalis Effect: How Ugly Initial Results Metamorphosize Into Beautiful Articles', *Journal of Management*, 43.2: 376–99 https://doi.org/10.1177/0149206314527133

Omobowale, Ayokunle Olumuyiwa., Akanle, Olayinka., Adeniran, Adebusuyi Isaac and Adegboyega, Kamorudeen. 2014. 'Peripheral Scholarship and the Context of Foreign Paid Publishing in Nigeria', *Current Sociology*, 62.5: 666–84, https://doi.org/10.1177/0011392113508127

'Open Science for the 21st Century: Draft ISC Working Paper'. 2020. *International Science Council*, https://council.science/publications/open-science-for-the-21st-century/

Pond, Brooks B., Stacy D. Brown, David W. Stewart, David S. Roane, and Sam Harirforoosh. 2019. 'Faculty Applicants' Attempt to Inflate CVs Using Predatory Journals', *American Journal of Pharmaceutical Education*, 83.1: 12–14, https://doi.org/10.5688/ajpe7210

Pratt, Michael G., Kaplan, Sarah and Whittington, Richard. 2020. 'Editorial Essay: The Tumult over Transparency: Decoupling Transparency from Replication in Establishing Trustworthy Qualitative Research', *Administrative Science Quarterly*, 65.1: 1–19, https://doi.org/10.1177/0001839219887663

Pusic, Martin V. 2014. 'Removing the Rose-Coloured Glasses: It's High Time We Published the Actual Data', *Medical Education*, 48.3: 334–35, https://doi.org/10.1111/MEDU.12312

Pyne, Derek. 2017. 'The Rewards of Predatory Publications at a Small Business School', *Journal of Scholarly Publishing*, 48.3: 137–60, https://doi.org/10.3138/jsp.48.3.137

Ross-Hellauer, Tony. 2017. 'What Is Open Peer Review? A Systematic Review', *F1000Research*: 1–37, https://doi.org/10.12688/f1000research.11369.1

Shehata, A.M.K. and Elgllab, M.F.M. 2018. 'Where Arab Social Science and Humanities Scholars Choose to Publish: Falling in the Predatory Journals Trap', *Learned Publishing*, 31.3: 222–29, https://doi.org/10.1002/leap.1167

Simmons, Joseph P., Nelson, Leif D. and Simonsohn, Uri. 2011. 'False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant', *Psychological Science*, 22.11: 1359–66, https://doi.org/10.1177/0956797611417632

Tutuncu, Lokman., Yucedogru, Recep and Sarisoy, Idris. 2022. 'Academic Favoritism at Work: Insider Bias in Turkish National Journals', *Scientometrics*, 127: 2547–76, https://doi.org/10.1007/s11192-022-04355-0

Van Noorden, Richard. 2020. 'Hundreds of Scientists Have Peer-Reviewed for Predatory Journals', *Nature*: 1–4, https://doi.org/10.1038/d41586-020-00709-x

Wallace, Frederick H., and Perri, Timothy J. 2018. 'Economists Behaving Badly: Publications in Predatory Journals', *Scientometrics*, 115: 749–66, https://doi.org/10.1007/s11192-018-2690-1

Wallerstein, I. M. 1991. *Geopolitics and Geoculture: Essays on the Changing World-System* (Cambridge, England: Cambridge University Press)

Xia, Jingfeng., Harmon, Jennifer L., Connolly, Kevin G., Donnelly, Ryan M., Anderson, Mary R. and others. 2014. 'Who Publishes in "Predatory" Journals?', *Journal of the Association for Information Science and Technology*, 66.7: 1406–17, https://doi.org/10.1002/asi.23265