COMETS

CNRS Ethics Committee

OPINION n°2016-32

« DISCUSSION AND MODERATION OF SCIENTIFIC PUBLICATIONS ON SOCIAL NETWORKS AND IN THE MEDIA : ETHICAL ISSUES »

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I. SUMMARY

Internet use is changing the way in which scientific works are published. The Open Science movement refers to the various ways in which scientific work can be accessed through digital means. Results can be published instantly and free of charge via open archives, scientific websites and open-access journals. The system for accessing publications and offering constructive criticism by peers (peer review) is now struggling to cope. The volume of articles being submitted to journals is constantly increasing. This is largely due to the fact that researchers' reputations and projects rely heavily on the length of publication lists. As the number of articles increases, so does the number of journals. Gold Open Access has given rise to a number of 'predatory' journals with fictitious editorial boards. There is an increasing demand for researcher-reviewers from journal editors, who often stipulate short turnaround times for the delivery of their reports. Peer review failings have led to social networks seizing upon these issues, opening up dialogue between researchers. The Retraction Watch website highlights a growing number of articles withdrawn by journals because they contain either errors or fraudulent data, which breaks the code of research ethics. The site PubPeer, initially intended as a platform for open discussion on published papers, reached a new level when it began to accept anonymous comments condemning dubious publication practices, such as manipulated tables and data, and even plagiarism, which the site helps to expose. COMETS discusses in this article both the duty every researcher has to expose the bad practices he or she is aware of, and the correct and incorrect use of anonymity. COMETS believes that scientific social networks - open to all, easy to use and interactive - are precious sources of information not only for publishers but also for research institutions. CNRS is advised to make appropriate use of them and encourage the publication of research findings using all available online methods, particularly HAL open archives. Finally, this discussion highlights the responsibility of all researchers in terms of how they publish their findings, be that directly, in journals for the general public or on social networks. Recommendations have also been made on how to avoid premature announcements that do not guarantee scientific rigour and may damage the public's perception of science.

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II. REFERRAL

CNRS Chief Research Officer.

The Digital age has brought about changes in the evaluation of scientific research findings. Certain scientific communities have begun discussing, analysing and critiquing scientific publications on sites such as JournalReview, PubPeer and Publons alongside peer review, which has been traditionally used by scientific journals and remains popular among researchers as a whole. These websites mostly contain forums where users expand on information taken from scientific publications, discuss non-reproducible works and highlight any errors. Access to these forums is open and unmoderated. Beyond any interest they may have for the scientific community concerned, these sites also help to identify any misconduct (plagiarism, manipulated data etc.) which may have been overlooked by official journal reviewers and editors. Signalling any misconduct is made even easier by the fact that comments can be made anonymously. This could be seen as a positive step, since any fraudulent results must be reported, as stipulated in the National Code of Ethics for Research Professions. However, anonymity and the lack of proof required could also lead to inflated or even malicious, assertions, which may harm a researcher's reputation before anyone can verify the claims. This has been the case on some of these sites. Comments on published articles posted on blogs, Online Journals Clubs and social networks can be even less restrained. These digital platforms are now used by the media, as well as by the scientific community. Journalists in particular use this information and broadcast it for their own ends. This can harm researchers' reputations and the public's perception of science as a result.

COMETS has been asked to examine scientific communities' heavy use of new digital tools to discuss published and unpublished research findings. It will examine researchers' responsibility to each other as well as their relationship with the media in terms of the information they publish on these platforms. Though unavoidable, these practices must be explored from an ethical point of view.

III. ANALYSIS

A. The transformation of scientific publishing in the digital world

1. Traditional publishing practices

The publication of research is an essential part of being a researcher, as this is how research findings are established. Until very recently, the dominant model involved submitting a paper to a journal with a reading committee selected based on the members' reputation and subject-area expertise. Publication makes the work available to the wider scientific community: the journal editor makes an initial selection of manuscripts and sends them to reviewers for evaluation (peer review). The finalised versions are then published and archived in collections. Journals are comparatively limited in number and their editorial processes are slow. Even the researcher's mood has an influence. All these elements make publication a significant event. Researchers only published their work if they believed it was 'worth the effort', attaching great value to the reliability of results and the editorial quality of the publication

Publication had become mired in these constraints. Communicating research findings outside of the scientific community was confined to niche publications aimed at popularising science. Studies that proved to be dubious or inaccurate were rarely corrected or withdrawn. Scientific fraud has existed throughout history and became so widespread half a century ago that a book was written on the subject in 1982. However, fraud was considered anecdotal and only reported in the Media when it affected well-known figures (the controversy surrounding the Nobel laureate David Baltimore) or had an impact on society (the Cyril Burt affair).

Internet use and a fundamental change in scientific research due to digital technology have led to a remarkable transformation by making it easier and faster to publish scientific research and by making it available to a larger audience. Today, scientific publishing is divided into three more-or-less separate stages: the publication of results, peer review and editorial approval. 'Publication' refers to the process of making research findings public in a journal or conference proceedings, or through open archives, blogs, websites and tweets. The content, originality, editing and sources of the document are then checked. This is normally carried out during peer review but also through discussions on social networks. Finally, an editorial team may approve it by publishing it in conference proceedings or in a journal issue. The finalised document is sometimes erroneously referred to as the publication.

2. Publication of results: the Open Science revolution

Researchers can publish their findings quickly and make them freely available all over the world via their personal website, an open archive platform or even by publishing them in open-access journals. Articles and various manuscripts (theses, conference papers, preprints or finalised articles) are published through

open-access databases on multi-disciplinary platforms, such as ArXiv and more recently HAL, created by CNRS in 2001, and INRIA and the University of Lyon's Centre for Direct Scientific Communication (CCSD) since 2014. Widely used in physics and computer science, these databases are being developed in other disciplines. HAL also provides a forum for discussing scientific articles for the communities concerned.

These changes are part of the Open Science movement, which refers to the various ways in which scientific work can be accessed and enriched through digital means. Other authors have called this phenomenon Open Knowledge Environments. It is based on the free distribution and use of primary research data (as advocated by COMETS in its 2015 report on open data). It also opens up scientific advancement by involving the wider community. In its 2012 report, COMETS expressed support for open access to scientific data online, but warned against the dangers of the 'author pays' system known as Open Access Gold (OAG). Journals of this type have grown considerably in recent years and the movement has been somewhat hijacked by a proliferation of predatory journals that are primarily interested in financial gain. Open Access Gold allows researchers in France and Europe to fulfil their obligation of making results available to all, However, this can just as easily be done through open archives, which is strongly supported by COMETS.

B. The peer review process: an ailing system

1. The growing number of articles

The number of journals is increasing in the digital age in response to the growing number of publications. There is more pressure to publish works and a growing number of researchers are now focusing on quantity rather than quality (see COMETS 2014 report on changes in the research professions). Research institutions and funding bodies are largely responsible for this. Quality is suffering as a result. The situation is serious: several studies have highlighted the unreliability and lack of reproducibility of published works in some disciplines, such as medicine.

These studies show how serious and damaging this dubious research can be. The rise in questionable publications highlights failings in assessment and the peer review process. Research institutions must remain constantly vigilant in this area.

2. Peer review failings

The peer review process and any eventual constructive criticism are generally considered essential by researchers. Today, however, peer review has its limits. Editors and some reviewers share the blame for current problems.

Reviewers are in greater demand because of the growing number of journals and articles that require validation (note that the time-consuming review process is not taken into account in researcher evaluation). They also come under pressure from journal editors, who compete on 'hot' topics and demand shorter turnaround times for reviews (two weeks for some journals!). This jeopardises the thoroughness of the

work. Reviewers are tempted to review publications too quickly, basing their report on the author's reputation or their standing within their scientific community. The problem may seem less significant for journals that use double-blind peer review. However, this system also has disadvantages and the benefits are still not clear despite tests on numerous occasions. Note that double-blind review may not comply with open archive publication policy.

Some journal editors have also significantly contributed to these changes by forcing researchers to publish positive results only and package them in a certain way, regardless of scientific rigour. Furthermore, the world of publishing is dominated by a small number of large companies that own 'prestigious' journals. Their business model has been heavily criticised by some groups of researchers and institutions (see COMETS 2011 report). Some of them have no qualms about breaking the rules to fast-track the review process for well-known figures or articles that examine controversial subjects to boost their impact. More damaging still is the system of organised deceit that recently came to light, revealing weaknesses in the peer review process. In 2014, the publishing house Springer had to withdraw 64 articles from 10 of its journals because authors had referenced their own work, giving false names and addresses for the reviewers.

Though comparatively rare, such methods are nevertheless used by several other publishers. Evidence shows that they are facilitated by journals offering authors the opportunity to use their own reviewers.

Ultimately, even when carried out to the highest standards, peer review is unable to prevent the publication of research that may later prove to be dubious or inaccurate. These unintentional errors, inherent in the scientific process, should be taken into greater consideration by publishers. As the Editor of EMBO J, Bernd Pulverer, pointed out in a recent editorial, authors and journals must be encouraged to see the transparent reporting of errors and fraud in published articles in a more positive light.

3. Initiatives to improve the peer review process

Faced with the limitations of traditional editorial processes, new initiatives are coming to light, particularly in the field of life sciences. Editors like Bernd Pulverer make reviewers' comments and authors' responses public to add to the dialogue between researchers. At the open-access journal Frontiers, reviewers and associate editors in charge of the publication interact transparently with the author throughout the entire editorial process, after an initial filtering stage. Names are only made public once the article has been accepted. eLife operates a similar policy of transparency. The F1000Research platform is an example of Open Science publishing. Peer review takes place after publication, comments and reviewer names are made public and articles are accompanied by the data on which their findings are based.

These exciting initiatives remain limited and may not be widely applicable. Peer review failings have led to social networks seizing upon these issues, opening up dialogue between researchers. These channels can be used to discuss published research and help to identify inaccurate or even falsified results, and in extreme cases fraud.

C. Social networks: new tools for commenting on, analysing and critiquing scientific publications

The increasing popularity of social networks is creating new spaces where researchers can share their findings quickly and freely, not only with their peers but also with professionals outside the world of research, such as journalists and the general public. There has been a sharp rise in these online networks, which are diverse in nature and objective. A recent study identified three categories: information sites, discussion sites and vigilante sites. We shall only discuss the second type, which can be advantageous but can also raise ethical issues. COMETS aims to explore these using two typical examples of social networks dedicated to scientific publications: Retraction Watch and PubPeer.

1. Retraction Watch: reporting errors and fraud

Launched in 2010 by two scientific journal editors, Adam Marcus and Ivan Oransky, Retraction Watch keeps a record of articles that have been withdrawn following publication. Articles are withdrawn by the author(s) or the journal, either because they appear to be fraudulent (copied or containing manipulated or fraudulent data), or because they contain errors. This applies to an increasing number of journals and disciplines. The number of withdrawals is constantly rising (15 per month in 2010, 60 in 2015), although it remains very low in relation to the total number of articles published (around 0.5 per 1000). Some question results dating back ten years or more. Withdrawals are rarely contested; they are often the result of investigations carried out by research institutions.
The rise in the number of withdrawals could be seen as an indicator of certain changes. It shows publishers' increasing awareness of misconduct and also demonstrates the weaknesses of peer review or even the negligence of certain publishers. By making the reasons for article withdrawal public, the managers of the site recently succeeded in getting journals to provide more detail, but this is not always the case. Although this is a positive step, it is not enough. Journals must include more information on how the article was inaccurate or misleading, and disclose discussions that led to its withdrawal in the scientific corpus. Many concerns are being raised about the withdrawal process itself. Errors and fraudulent results are treated in the same way, even though errors are inevitable in scientific research. Rather than hiding them, it is much better to acknowledge them and provide links to other sources with corrections.

The option to withdraw is considered a factor in the improvement of rigour and integrity. The acknowledgement of errors and especially fraud limits their impact on the scientific community, which was simply misled. The site helped to expose serious frauds like those of Yoshitaka Fujii (183 withdrawals), Joachim Boldt (94 withdrawals) and Diederik Stapel (55 withdrawals). It was behind the reporting of widespread misconduct in several scientific publishing houses, as mentioned above. The information it uncovered can only lead to greater vigilance, particularly with regard to authors whose articles were withdrawn but who continue to publish using the same dubious methods, often without indicating on their publications list that some of their articles have been withdrawn. It should be noted that certain publications are still cited after being withdrawn. However, some authors are subject to financial penalties or lose laboratory funding after their articles are withdrawn.

2. PubPeer: the age of PPPR (post-publication-peer-review)

The site PubPeer, launched in 2013, was initially intended as a platform for the open discussion of published articles. It aims to provide a space for experts in the field to exchange information and interpretations and is based on the idea that peer review can be flawed or require greater detail. The site is particularly focused on life sciences and health.

It took on a new dimension and became more than a standard journal club when it began allowing anonymous comments.
Anonymity actually makes it easier to denounce the use of questionable practices (manipulated figures and data, plagiarism etc.) that may have escaped the notice of reviewers and journal editors. Several publications by renowned researchers from important international institutions have had to be withdrawn as a result. When misconduct is exposed, it prompts readers to examine the author's earlier scientific output, looking for, and often finding, further examples of it.
High impact journals receive many comments. One of the site's advertised aims is to counterbalance the undue influence of 'prestigious' journals, as well as the importance attached to these articles for the evaluation of researchers, which it deems to be disproportionate. PubPeer's founders explain in a blog post entitled 'A crisis of trust' that the comments on articles published on their website are symptomatic of a deep malaise in modern science. They point out that: "The incentives to fabricate data are strong: it is so much easier to publish quickly and to obtain high-profile results if you cheat." The pressure to publish exists in all fields; PubPeer today mainly focuses on life sciences but is developing across other disciplines.

3. The correct and incorrect use of anonymity

When anyone involved in research becomes aware of bad publishing practices or that researchers are falsifying result in their laboratory, they are obliged to report it as stipulated very clearly in the European Code of Conduct for Research Integrity and in the National Code of Ethics for Research Professions, adopted in France in 2015. However, condemning these practices can be difficult in the context of a team. Hierarchy is an important factor and the team can become shut off from the world and difficult to escape from. Young researchers may come under a great deal of pressure, with threats being made to their future careers. There is no doubt that anonymity facilitates the exposure of scientific misconduct, as we saw with PubPeer. It should be noted that social platforms like PubPeer have codes and terms of use that govern the right to anonymity, and most opinions on the articles discussed are given based on this condition.

Nevertheless, anonymity and the lack of required proof can also lead to inflated, even malicious, assertions, which may harm a researcher's reputation before claims have been verified. It allows commentators to tarnish the names of their competitors with complete impunity and hide any conflicts of interest. PubPeer has curbed this practice due to the fact that criticised authors are informed of the comments and invited to respond. Moreover, site moderators immediately remove 50% of allegations that have no scientific grounding and only leave those that appear to be based on verifiable facts.

4. Scientific social networks as a resource

The two websites mentioned above have undeniable benefits. There are other, less-influential sites that also allow comments on articles (e.g. Pubmed Commons, Publons, JournalReview). These herald new practices, although their advantages and disadvantages are impossible to predict on the long term. Their appeal lies in the fact that they are open to all, easy to use, interactive, allow the rapid dissemination of information and are not subject to external moderation by research institutions. They also present themselves as one of the possible solutions to some of the changes observed.

Some journals take action based on anonymous and non-anonymous comments posted on PubPeer or referred by Retraction Watch. Their editors use them to investigate publications considered to be dubious or fraudulent. They may request that these articles be rectified or withdrawn, in stark contrast to the widespread practice of ignoring any form of misconduct that might damage their reputation. As for research institutions, COMETS believes they ought to adopt a positive attitude towards innovative approaches introduced by scientific social networks. They should also take account of the resources they provide, if only to follow the scientific debates that develop. Finally, they must respond to any sign of misconduct in fields where cheating would otherwise have gone unnoticed.

As well as acting as censors, scientific social networks that bring together critiques, reviews and comments are likely to become increasingly useful and beneficial over time. Their usefulness is due to new knowledge-sharing methods that offer everyone the opportunity to share their research findings online. Earlier, we defined three previously overlapping stages in the system: publication, review and certification. Scientific social networks will probably contribute to the review and certification stages by way of new procedures that are yet to be defined. They will not only help to establish the value of publications but also to produce graphs and meta-knowledge on researcher networks, their links and the research they undertake. In this respect, they will play a central role. It is for this reason that institutions must not allow private online and print publishing companies to control this area.

D. Sharing research results with the press

This concerns the right of every citizen to be informed about advances in scientific research. Research results are regularly explained in journals aimed at popularising science, and many of these are of a very high quality. However, research results are obtained in a different way by the non-specialist press and mass media. These media outlets gather their information from research institutions' press offices, scholarly associations and even from researchers themselves, either directly, through their publications or via social networks.

COMETS wishes to highlight researchers' responsibility for sharing their results with the press and emphasise the importance of training in how to go about this, as suggested in its 2015 report on citizen science.

Precautions must be taken when contacting journalists directly, whether science specialists or not. For example, the researcher must make sure that they will be able to review the article written based on their findings in order to avoid distortion or conflation, whether purposeful or not, and to verify that the context has been taken into account. Researchers must also remember that the media is likely to act immediately on information shared through blogs and social networks. They must be very careful about the terms they use to describe their work. Inaccurate terminology can result in the public being misled, not having been given the necessary information to differentiate between scientific proof and a speculation appearing at the end of a publication. Some scientific journals even go so far as to make promises in the article abstract with the hope of boosting readership, especially if the subject is related to health, an area in which the public is particularly interested.
Researchers must also clarify the status of any results when they share them with journalists. On subjects likely to provoke debate on a social level, often straddling various fields – issues on climate change or the environment, for example – researchers should consult the collective expertise and underline the difference between concrete results and their own opinions. Furthermore, it has been shown that in some fields only parts of original studies are later confirmed by further work on the same subject. However, the press prioritises the reporting of the initial study and almost never informs the public when it is partly or even wholly disproved, which is often the case. If the results are from an initial study, the researcher must explain that the discovery needs to be confirmed by other teams.

Generally speaking, researchers should not share their results with the mainstream press before they have been reviewed by their peers, however strong the temptation to get exclusive media coverage. This includes the sharing of results pre-publication through open archives and websites. Sensationalist and premature announcements resulting in media headlines and often over-analysis can have a disastrous impact on public opinion if they later turn out to be false. Findings by large-scale collaborations in physics (the Higgs boson and gravitational waves) announced in spectacular fashion in the media were published simultaneously and only after a truly rigorous verification process.

In any case, some researchers have no qualms about using the press and social networks anonymously to expose problems in their own laboratories. In most cases, these problems should remain within the professional environment.

The Internet also acts as an amplifier, as any supposedly ground-breaking information immediately spreads through the media and social networks, thereby gaining disproportionate coverage in relation to the facts. At a time when flaws are becoming apparent in the scientific publication process, certain media outlets looking for a scoop under the pretext of informing the public have set out to condemn the research system by publishing headline articles on fraud in science. Of course, journalists must not be influenced or pressured. Informing the public on everything that happens in the world of science is part of their job, whether it be explaining important findings or analysing the environment in which researchers work. All we can do is encourage researchers, with the support of scholarly associations, to involve themselves to a greater extent in discussion with journalists. In general, the press is merely looking for information on emerging ‘hot’ topics. However, unfortunately their work is too often limited by tight deadlines.

IV. RECOMMENDATIONS

COMETS believes it would benefit CNRS to keep a close eye on the main post-publication discussion networks. These forums appear on dedicated, self-moderated platforms, such as PubPeer. Such websites contain information on the debates taking place within various scientific communities and provide a response to some of the lacunae in peer review. COMETS advises the CNRS institute scientific boards to consult them as regularly as possible so they are in a position to investigate or provide relevant information to the media.

Social networks play an important role in scientific debate. CNRS should launch a study on how best to regulate these new communication tools and how to raise awareness regarding the code of ethics that needs to be observed by all researchers who use them for professional purposes. Researchers need to be made aware of how to communicate on these websites and with the media in all its forms, whether this is new media, such as social networks, or more traditional types of mass media. They need to understand how their message might be used or even hijacked.

COMETS reminds researchers that they should not share their results with the mainstream press before they have been reviewed by their peers – this includes the sharing of results pre-publication through open archives, social networks and websites. By avoiding the temptation to get a scoop, they also avoid over-analysis by the press and the risk of error involved in announcing results too early.

CNRS should encourage the publication of research findings through Open Science, raise awareness concerning this paradigm shift and, in line with the specific nature of each discipline, promote the new opportunities presented by the digital environment: the collection of data by the various platforms, the distribution of preprints and articles through open archives, and the discussion of submitted articles or those published online etc. In this way, the HAL open archives for institutions (and also the arXiv and bioRxiv archives) can serve as a forum for scientific debate. It would therefore be advantageous to run an awareness-raising programme to clarify the current conditions for posting and sharing publications through HAL.

COMETS underlines the importance of making researchers aware of their responsibilities when they review articles for publication. They must undertake to resist the pressure applied by certain journals to rush the review process. We suggest that the reports they produce for major journals in their field are listed on their activity report. We also advise CNRS institutes to organise debates on methods of public debate, which are currently being discussed in many international journals.