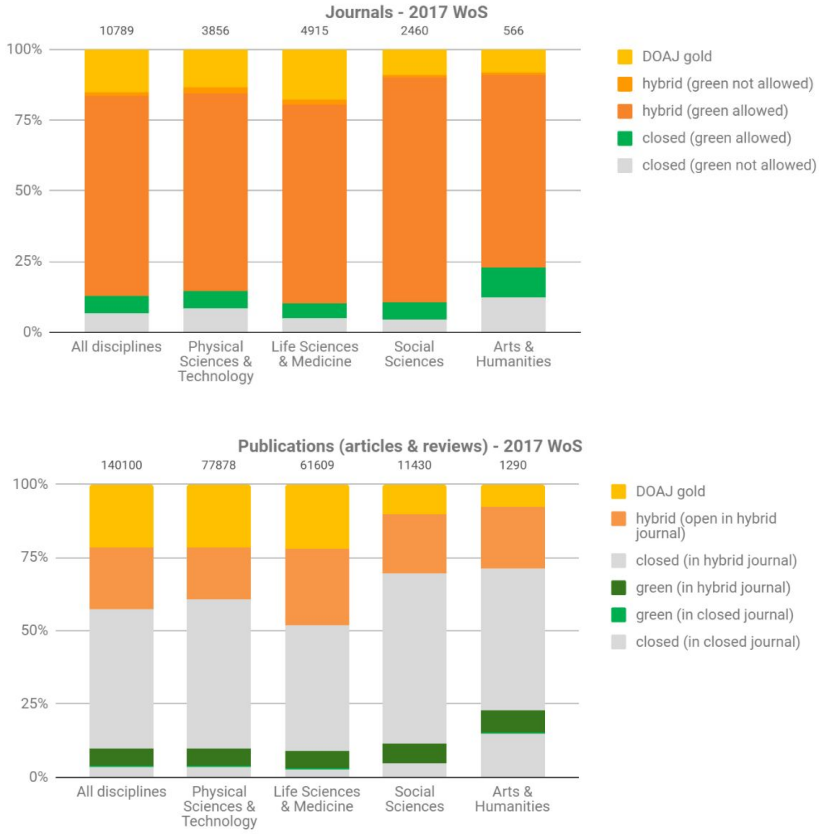
Open access potential and uptake in the context of Plan S

- a partial gap analysis -



November 2019

Prepared by Bianca Kramer & Jeroen Bosman
Utrecht University Library

This work was commissioned on behalf of cOAlition S by the Dutch Research Council (NWO), a member of cOAlition S. Bianca Kramer and Jeroen Bosman of Utrecht University Library were appointed to lead the project.

Open access potential and uptake in the context of Plan S - a partial gap analysis

Utrecht, November 2019

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Executive summary

Context
Plan S, launched in September 2018, aims to accelerate a transition to full and immediate Open Access. In the guidance to implementation, released in November 2018 and updated in May 2019, a gap analysis of Open Access journals/platforms was announced. Its goal was to inform Coalition S funders on the Open Access options per field and identify fields where there is a need to increase the share of Open Access journals/platforms.

The analysis presented in this report, carried out by Utrecht University Library, aims to provide cOAlition S with initial quantitative and descriptive data on the availability and usage of various open access options in different fields and subdisciplines, and, as far as possible, their compliance with Plan S requirements. As such, it should be seen as a first step: an exploration in methodology as much as in results. Subsequent interpretation (e.g. on fields where funder investment/action is needed) and decisions on next steps (e.g. on more complete and longitudinal monitoring of Plan S-compliant venues) is intentionally left to cOAlition S and its members.

Approach
For this analysis, we looked at the journals in Web of Science in which cOAlition S-funded research was published in 2017. We included all members of cOAlition S at the time of sampling (November 2018) as well as EC and ERC. Combining information from various sources (notably Unpaywall, Directory of Open Access Journals, Crossref and SHERPA/RoMEO), we analyzed the proportion and characteristics of full OA journals, hybrid journals and journals allowing green OA (self-archiving) in four main fields and 30 subdisciplines, as well as the proportion of articles with cOAlition S funding that made use of these options for OA publishing. We also looked, as far as possible, at the proportion of journals meeting plan S requirements regarding copyright retention, compliant CC-licenses and absence of embargoes. The analysis did not include the technical requirements for journals and repositories mandated or recommended in Plan S, transparency of costs and prices, or the extent to which hybrid journals are currently part of transformative arrangements for cOAlition S funded researchers, as this could not be determined using our methods. Also, it should be stressed that any gaps and compliance levels revealed in this study can not and do not take into account the effects of planned or expected policy changes, or changes that have been implemented since 2017.

The study also briefly reports on distribution of journal size and, for full gold OA journals, publisher types and publication fee levying. Finally, in addition to information about open access options, the reports also covers some aspects of publication cultures in the respective fields and subdisciplines: the role of societies, the importance of languages other than English, typical numbers of co-authors and CC-licenses used. This provides contextual information to enhance the interpretation of the analyses and identify potential for policy changes.

Limitations

As this analysis is only based on journals included in Web of Science, it should be seen as a first attempt or proof of concept. We identify and address a number of methodological limitations and inherent biases in our data, and give recommendations for a more complete analysis using additional (and ideally fully open) data sources. Methodological and data limitations in this study lead to lack of coverage (esp. in social sciences and arts & humanities) and some underestimation (a.o. of hybrid and green OA). Regarding coverage, Web of Science has a known bias towards the sciences, a time lag in including new journals and geographical biases in coverage. In particular, the low numbers of journals and articles in certain fields in social sciences and almost all fields in the arts & humanities limits the usefulness of the approach taken in this gap analysis for these fields.

Main results - potential and uptake of open access types

The report shows the number and proportion of gold OA DOAJ journals, hybrid journals and closed journals per main field and for 30 subdisciplines, as well as the number and proportion of hybrid and subscription journals allowing green archiving. Similarly, the number and proportion of articles of each OA type in these journals per main field are reported. The results show that in all main fields, including arts & humanities, over 75% of journals in our analysis do allow gold open access publishing. This currently consists predominantly of hybrid journals, which authors can only use in a Plan S compliant publishing route when the journal is part of a transformative arrangement or when authors also immediately share their article as green OA. Almost all hybrid journals included in this analysis (irrespective of discipline) do allow for green OA archiving, but green OA options could only be detected for about 50% of closed journals. The largest shares of full OA journals are found in life sciences & medicine and physical sciences & technology, which is also reflected in their uptake. The most striking though not surprising result is the very large number of closed publications in hybrid journals, also given the fact that most of these journals do allow green open access. The share of open access publications in hybrid journals is, again, the highest in life sciences & medicine but surprisingly the lowest in physical sciences & technology, with intermediary levels in social sciences and in arts & humanities.

Main results - licenses allowed by full gold and hybrid journals

Using information from DOAJ directly as well as license information from Crossref and Unpaywall, the number of *full gold journals* allowing CC-BY/SA/ND or public domain licensing, as well as author copyright retention, was retrieved. The results show that a sizeable proportion (52%) of full gold OA journals already allow Plan S compliant licenses as well as copyright retention and importantly, that these journals are responsible for a large majority (78%) of articles published in full OA journals by cOAlition S fundees. The biggest opportunity (in a quantitative sense) for physical sciences & technology and life sciences & medicine is increased offering of copyright retention, while in arts & humanities it is increased offering of compliant licenses.

Using information at journal level from Crossref, SHERPA/RoMEO and Unpaywall, an estimation can be made of the number and proportion of *hybrid journals* in a field currently

allowing a CC-BY/SA/ND license for OA articles. The results show that, depending on the main field, between 30-50% of hybrid journals currently allow the use of Plan S compliant licenses.

Main results - green open access embargoes
Almost all hybrid journals and about half of the closed journals in our analysis do allow green OA archiving. The results show that in physical sciences & technology and life sciences & medicine, a 12 month embargo is most prevalent, with longer embargoes more common in social sciences and especially arts & humanities. At the same time, there are examples of journals with a 0 month embargo in all fields. In social sciences particularly, a relatively large share of journals does not impose any embargo. Information on licenses for green OA is limited, but preliminary results show that only a very small proportion of journals explicitly allow green archiving with a Plan S compliant license.

Looking forward: potential for actions
The report reveals numerous differences between main fields and between the various subdisciplines in current availability and -to a certain extent- levels of Plan S-compliance of open access publishing options, as well as in usage of these options by cOAlition S-funded authors. These differences may provide insights into current gaps in availability and usage. They can also show which approaches are working well in particular contexts and provide fields and venues that can serve as examples or role models. Such insights can inform initiatives by publishers, funders and institutions to increase the number and attractiveness of Plan S-compliant publishing options, and increase opportunities for authors to make use of those. This could include policy changes by publishers (e.g. on copyright retention, licenses and embargo periods) and new policy introductions as part of or in response to plan S, such as changes in evaluation, support for full gold OA publication venues (including diamond OA venues) and open access infrastructure, increase of transformative arrangements for hybrid journals, and a model license to publish as proposed by cOAlition S.

Recommendations
While it is possible to use various types of information on the same journals from different databases (as done here), this is time- and resource-intensive. Moreover, it inevitably affects the quality of information by bringing together information from disparate sources that might be incompletely or incorrectly matched. For a full, reliable gap analysis, it would be preferred to systematically collect and harmonize information (which can be derived from different sources) into one system, which could then be used for longitudinal analyses of both potential and usage of different OA options. Special attention should be given to inclusion of a broad spectrum of journals to prevent any structural biases in discipline, language or geography.

1. Introduction

Plan S, launched in September 2018, aims to accelerate a transition to full and immediate Open Access. In the guidance to implementation, released in November 2018 and updated in May 2019, a gap analysis of Open Access journals/platforms was announced. Its goal is to inform Coalition S funders on the Open Access options per field and identify fields where there is a need to increase the share of Open Access journals/platforms.

The analysis presented in this report, carried out by Utrecht University Library, aims to provide cOAlition S with initial quantitative and descriptive data on the availability and usage of various open access options in different (sub)disciplines, and, as far as possible, their compliance with Plan S requirements. As such, it should be seen as a first step: an exploration in methodology as much as in results. Subsequent interpretation (e.g. on fields where funder investment/action is needed) and decisions on next steps (e.g. on more complete and longitudinal monitoring of Plan S-compliant venues) is intentionally left to cOAlition S and its members.

For this analysis, we looked at the journals in Web of Science in which cOAlition S / EC / ERC-funded research was published in 2017. Combining information from Unpaywall, DOAJ, Crossref, SHERPA/RoMEO, GOAJ4 and Scilit (services and databases providing data on journal publishing), we analyzed the proportion and characteristics of full OA journals, hybrid journals and journals allowing green OA (self-archiving) in four main fields and 30 subdisciplines, as well as the proportion of articles with funding from cOAlition S members that made use of these options for OA publishing. We also looked at the proportion of journals meeting plan S requirements regarding copyright retention, compliant CC-licenses and zero embargo, as well as some other characteristics as type of publisher and average number of co-authors per article. This analysis does not include the technical requirements for journals and repositories mandated or recommended in Plan S, transparency of costs and prices, or the extent to which hybrid journals are currently part of transformative arrangements for cOAlition S funded researchers.

As this analysis only includes journals included in Web of Science, it should be seen as a first attempt / proof of concept. We identify and address a number of methodological limitations and inherent biases in our data, and give recommendations for a more complete analysis using additional (and ideally fully open) data sources. It should also be stressed that any gaps and compliance levels revealed in this study can not and do not take into account the effects of planned or expected policy changes, or changes that have been implemented since 2017.

This analysis is not the only empirical attempt at assessing to what extent current publishing options and behaviour meet the proposed Plan S requirements. Some studies focus on the availability (and compliance) of full OA journals only (Frantsvag and Strømme (2019), Carling et al. (2018), SpringerNature (2019). A somewhat broader look is offered by Deltathink (2019) with

an analysis of the overall number of full OA journals according to various databases. Other studies focus on one discipline, such as the recent study by the Royal Historical Society that also uses a publisher survey indicating how publishers might react to Plan S in the field of history. The same approach of asking publishers what options they see was used by Highwire. Probably the most broad comprehensive study is that by Clarivate (2019) that looks at cOAlition S size, impact of cOAlition S funder's papers, types of OA output by country and more. What our analysis adds to these is mainly the level of detail, by discipline and subdiscipline, the broad approach, looking at all types of open access, the double view of looking at the potential and at real uptake and the context of publication cultures in various (sub)disciplines. With that, this approach attempts to provide as much insight as possible given the constraints of the data and short of creating and analyzing a full registry of all publication venues.

The report reveals numerous differences between main fields and between the various subdisciplines in current availability and -to a certain extent- levels of Plan S-compliance of open access publishing options, as well as in usage of these options by cOAlition S-funded authors. These differences may provide insights into current gaps in availability and usage. They can also show which approaches are working well in particular contexts and provide fields and venues that can serve as examples or role models.

These insights can inform initiatives by publishers, funders and institutions to increase the number and attractiveness of Plan S- compliant publishing options, and increase opportunities for authors to make use of those. This could include policy changes by publishers (e.g. on copyright retention, licenses and embargo periods) and new policy introductions as part of or in response to plan S, such as changes in evaluation, support for full gold OA publication venues and open access infrastructure, increase of transformative arrangements for hybrid journals, and a model license to publish as proposed by cOAlition S.

2. Methodology

Availability and usage of various open access options (full gold in DOAJ journals, hybrid, and green) were determined in November 2018 for all journals in Web of Science with publications from 2017 with cOAlition S/EC/ERC funding acknowledged (including all cOAlition S members at the time of sampling). Detection of both availability of OA options (at journal level) and usage thereof (at article level) was based on OA classification of articles published in these journals (Fig. 1). Subject classification at journal level in Web of Science was used to analyze these parameters for various (sub)disciplines. The basic approach used here was developed and reported on earlier in two blog posts (Kramer & Bosman 2018a and Kramer & Bosman 2018b)

Detection of hybrid journals was augmented with information from Unpaywall directly, as well as from Crossref and SHERPA/RoMEO. Information on licenses for gold OA (at journal level) was taken from DOAJ, Crossref and Unpaywall directly. Information on embargoes, licenses and copyright retention was extracted from full journal policies in SHERPA/RoMEO. Finally, GOAJ4 was used to get information on publisher types (for full OA journals only) and the average number of co-authors was derived from SciLit. For all these additional data sources, journal matching was done on the basis of ISSN/e-ISSN.

In this report, we define different types of OA as follows:

- full gold (DOAJ)
    - At journal level, this includes **journals listed in DOAJ** at time of publication**.**
    - At article level, it includes **all articles in journals labeled full gold (DOAJ)**.
- hybrid
    - At journal level, this includes **all non-DOAJ journals with articles with an open license** (Creative Commons or publisher-specific) or journals labeled ‘hybrid OA’ in SHERPA/RoMEO.
    - At article level, articles in hybrid journals are either labeled as **open in hybrid journal** (all articles in hybrid journals that are free to read on the journal website), **green in hybrid journal** (see below)**,** or **closed in hybrid journal**.
- green
    - At journal level, this includes hybrid and closed journals for which otherwise closed articles **can be made available through green open access (either author-accepted manuscript or publisher version),** based on article-level information in Web of Science or journal self-archiving policies from SHERPA/RoMEO.
    - At article level, otherwise closed articles available through green OA are labeled as **green in hybrid journal** or **green in closed journal**, depending on the classification of the journal as described above.

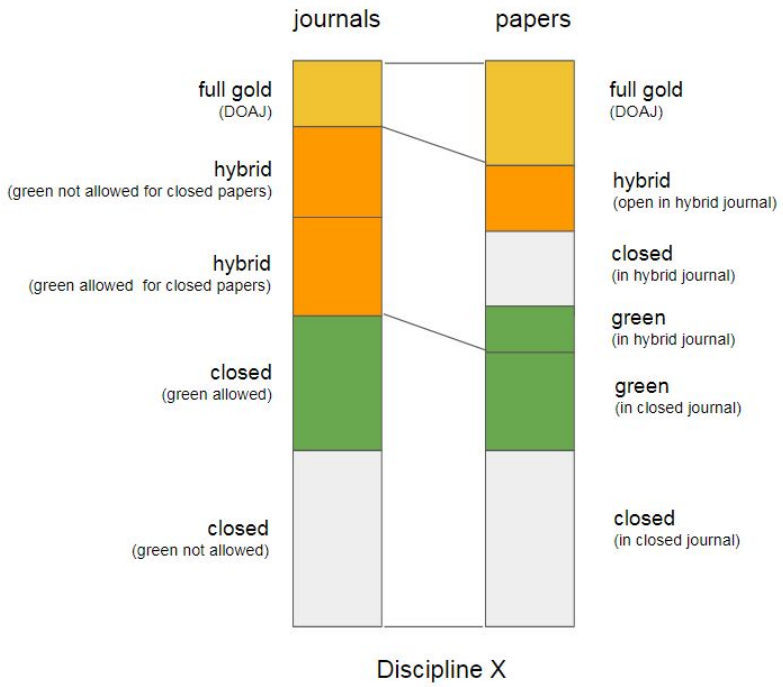


Fig 1. Schematic representation of availability (at journal level) and usage (at article level) of OA options - to illustrate the main presentation of results in this gap analysis.

Limitations of this approach include, but are not limited to, coverage of Web of Science, funder detection, effects of OA detection and classification, and the ability to take specific Plan S requirements into account. These limitations are explained in more detail below.

- Coverage of Web of Science
  Web of Science represents only a selection of academic journals, with a known bias against non-Western journals, journals in languages other than English, and journals in the arts & humanities and to a smaller extent the social sciences. In addition, many newer journals and journal platforms are not (yet) included in Web of Science. **This means that any conclusions drawn on the basis of Web of Science data alone are by definition not representative of the full journal landscape,** especially, but certainly not exclusively, for arts & humanities.

- Funder detection
  Only those journals are included in which one or more articles are published in 2017 that list a cOAlition S funder or EC/ERC funding. Confining the analysis to the 2017 outcomes of research funded by cOAlition S members is optimally representative of the de facto publication options and their use by cOAlition S funded researchers at the time. As funder detection in Web of Science is a) not harmonized and b) not complete, this is

inevitably an underrepresentation of the total research output by cOAlition S fundees. **As a result, the set of journals included in the gap analysis will likely not represent the total set of journals cOAlition S fundees publish in.** It should also be noted that the current analysis reflects the composition of cOAlition S at the time of data collection (November 2018). This also implies a strong bias towards research with European (co-)authors, as non-European funders were, and are still, a minority in cOAlitions S.

- OA classification and detection
  Journals are classified as DOAJ gold, hybrid or closed on the basis of the OA classification of articles published in them (using Unpaywall data as integrated in Web of Science). The same method is used to determine which journals allow green OA deposit of closed articles. This approach has the following limitations:

  - only articles with CC-license are classified as 'Other gold' in Web of Science (which we include as hybrid); articles with e.g. publisher-specific or implied OA licenses are not included in this category. **This leads to an underestimation of (articles in) hybrid journals.**
  - only articles classified as 'accepted version' (AAM) or 'published version' (VOR) by Unpaywall are included as green OA in Web of Science. Because version detection in Unpaywall is conservative, **this may result in underestimation of articles available as green OA, and thus of journals that allow green OA.**
  - journals with low volumes of articles, journals in which hybrid publishing is more rare (e.g. due to a lack of funding in the journal's field) and journals with longer embargo periods may not have any OA article detected for 2017, even though they allow hybrid or green OA. **This may lead to an underestimation of hybrid and green OA.**

  To compensate for these limitations in OA detection and classification when using Web of Science only, additional information from Crossref, SHERPA/RoMEO and Unpaywall directly is used to identify journals allowing hybrid OA and green OA (AAM/VOR only). While each of these sources have technical and coverage limitations in their own right, **this combination of data gives a more complete picture of journals allowing hybrid and green OA**.

  At article level, enrichment of OA detection and classification based on additional sources is more limited, because information on OA options at journal level does not give information on which articles are using those options. One exception is formed by articles identified in WoS as bronze OA in non-DOAJ journals (without CC-license). These were classified as (hybrid) gold OA when the journal was identified as hybrid based on information from Crossref, SHERPA/RoMEO or Unpaywall directly.

- Ability to take specific Plan S requirements into account
  Some of the specifics of OA detection and classification in Web of Science mentioned

above are already in line with Plan S requirements: only including AAM/VOR for green OA, and articles with CC-licenses (though not limited to CC-BY/SA/ND) for hybrid journals. To further assess the degree to which journals meet specific Plan S requirements, information was used from DOAJ (copyright retention and licenses for full gold OA), Crossref and Unpaywall directly (licenses for full gold and hybrid OA). For green OA, SHERPA/RoMEO was used to get information on copyright retention, licenses and embargo periods for green OA (self-archiving). Information on copyright retention for hybrid OA journals could not easily be gathered from existing databases and is therefore not included.

The current analysis does not cover all Plan S requirements. Information on compliance with technical requirements for journals and platforms is not readily available from existing databases, and therefore not included. The requirements for transparency of costs and prices first need to be operationalized before they can be assessed at journal level. Finally, the extent to which hybrid journals are currently part of transformative arrangements has not been included. This would entail defining and gathering a complete overview of existing arrangements fitting Plan S goals between publishers and institutions and consortia worldwide. In addition, it would require assessing the extent to which these cover the authors of individual research articles in our sample, which our data do not allow.

As a result, **the current gap analysis approach to some extent allows for assessment of specific Plan S requirements at journal level.**

Plan S requirement / aspect	**Included in quantitative analyses in this study**
OA types	Yes: gold, hybrid, green
License types	Yes
Embargo lengths	Yes
Copyright retention	Yes, for full gold OA and green OA only
Technical requirements for journals and platforms	No
Transparency on cost and prices	No
Transformative arrangements	No

Table 1. Plan S aspects and requirements addressed in the quantitative assessments in this study.

- Ability for publisher level analysis
  Though data on publisher are available for journals in Web of Science, they are not harmonized and thus time consuming to process. For this reason, analysis at publisher level is not attempted here.

3. Main results

The results of the analysis are presented at overall level and for 4 main disciplines: physical sciences & technology, life sciences & medicine, social sciences and arts & humanities. Data have also been collected for the 10 largest subdisciplines of each of these groups. For arts & humanities and some subdisciplines of social sciences, the number of journals and articles in the subdisciplines identified in Web of Science are generally too low for an analysis per subdiscipline to be representative of the respective fields. In addition, the subdisciplines identified in Web of Science also do not justice to the great diversity of the field of arts & humanities (see e.g. Mongeon & Paul-Hus (2016, paywalled)).

For these reasons, we present data for only 8 subdisciplines of the social sciences and 2 subdisciplines of arts & humanities (using ~85 journals and ~200 publications as cut-off points), next to 10 subdisciplines each for both physical and life sciences. Analysis of more subdisciplines, especially in arts & humanities, would demand more data (from sources beyond Web of Science) to produce reliable results. For the 30 subdisciplines we created short narratives with the main results and some additional information on selected aspects of the publication culture in each field.

In this chapter, overall results are presented, including important differences between the four main disciplines. In Chapter 4, results for the four main disciplines will be described in more detail. This is followed by a graphical representation of the results for the 30 subdisciplines (Chapter 5) and the narratives for each of the subdisciplines (Chapter 6).

3.1 Open access options and usage

Graphical results show the number and proportion of gold OA DOAJ journals, hybrid journals and closed journals per main field, as well as the number and proportion of hybrid and subscription journals allowing green archiving. Similarly, the number and proportion of articles of each OA type in these journals per main field are shown (Fig. 2).The top graph can be seen as mainly the result of choices made by publishers, the bottom graph as the result of choices mainly made by researchers. Those choices are made in the context of goals, financial considerations and requirements that are also influenced by funders and institutions. The data are also available per subdiscipline (see Figure A: Open access options and usage). These data do not yet show compliance with Plan S requirements for copyright retention, licenses and embargo periods (which will be shown separately). They also do not show the proportion of hybrid journals that are part of transformative arrangements, as this could not be determined with our methods. However, the uptake of open access in hybrid journals observed is of course influenced by existing arrangements at the time of publication.

Fig. 2. Gold, hybrid and closed journals and publication behaviour, total and main disciplines, 2017

The results show that in all main fields, including arts & humanities, over 75% of journals in our analysis allow gold open access publishing. This currently consists predominantly of hybrid journals, which authors can only use in a Plan S compliant publishing route when the journal is part of a transformative arrangement or when authors also immediately share their article as green OA.
Almost all hybrid journals included in this analysis (irrespective of discipline) do allow for green OA archiving of closed content, but green OA options could only be detected for about 50% of closed journals. Largest shares of full OA journals are found in life sciences & medicine and physical sciences & technology, which is also reflected in their uptake. The most striking though not surprising result is the very large number of closed publications in hybrid journals, also given the fact that most of these journals do allow green open access. The share of open access publications in hybrid journals is, again, the highest in life sciences & medicine but surprisingly the lowest in physical sciences & technology, with intermediary levels in social sciences and in arts & humanities.

To better interpret the data on availability and usage of open access options, it is useful to also have information on journal size distributions (Appendix A1). This provides insight in the prevalence of larger vs. smaller journals in a field, and the proportion of (open access) articles published in journals of different sizes. Transition towards Plan S compliant publishing options is likely more complex in fields with a more scattered publishing landscape, especially when having more smaller journals also means having more different publishers.

3.2 Full gold OA - CC licenses and copyright retention

Using information from DOAJ directly as well as license information from Crossref and Unpaywall directly, the number of full gold journals allowing CC-BY/SA/ND or public domain licensing, as well as author copyright retention, was retrieved (Fig. 3). As license information in DOAJ only reflects the most restrictive license used at a journal, this might give an under-estimation of the number of journals allowing Plan S compliant licenses. Therefore, information from DOAJ was combined with license information per journal from Crossref and Unpaywall directly, and the most permissive license selected for each journal. Journal matching in both DOAJ, Crossref and Unpaywall was done on ISSNs. The results show that a sizeable proportion of full gold OA journals already allow Plan S compliant licenses as well as copyright retention and importantly, that these journals are responsible for the large majority of articles published in full OA journals by cOAlition S fundees. Looking at published papers, the biggest opportunity (in a quantitative sense) for physical sciences & technology and life sciences & medicine is increased offering of copyright retention, while in arts & humanities it is increased offering of compliant licenses. The data are also available per subdiscipline (see Figure B: Full gold OA journals - CC licenses copyright retention).

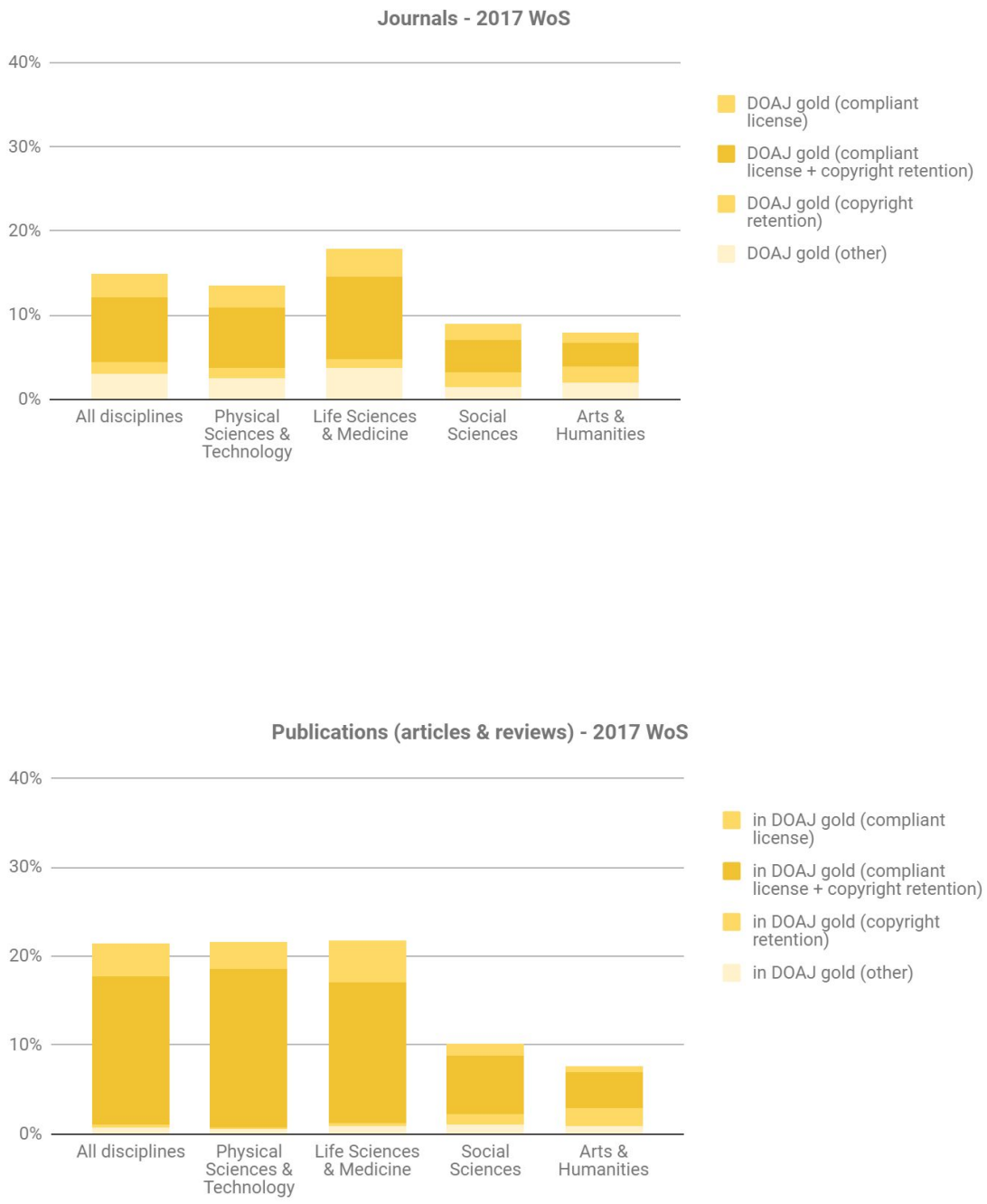


Fig. 3. DOAJ journals in WoS: compliance with license and copyright retention requirements, total and main disciplines, 2017

In addition to information on licenses and copyright retention, we also analyzed how the full gold OA journals in our sample are distributed across publisher types (traditional publishers, society publishers and university publishers (including university presses)), and what the proportion of fee-based and non-fee based full gold OA journals is across (sub)disciplines. This information (based on GOAJ4 and the accompanying dataset, collected by Walt Crawford) is available in Appendix A2. Unfortunately, this information is not readily available for subscription journals.

3.3 Hybrid journals - licenses

Using information at journal level from Crossref, SHERPA/RoMEO (which contains a metadata field stating whether a journal has a 'Paid OA option') and Unpaywall directly, an estimation can be made of the number and proportion of hybrid journals in a field currently allowing a CC-BY/SA/ND license for OA articles (Fig. 4).The results show that, depending on the discipline, between 30-50% of hybrid journals currently allow the use of Plan S compliant licenses.The data are also available per subdiscipline (see Figure C: Hybrid journals - licenses).

It seems that the main gain can be achieved by having journals that already offer OA licenses to start offering Plan S compliant licenses (again, these journals also have to be entered into a transformative arrangement in order to become Plan S compliant, although authors can also immediately share their articles as green OA for compliance). In arts & humanities there is also a big gain possible by having journals start offering OA licenses at all. In reality, we also see journals limit the use of Plan S compliant licenses depending on the funding the authors received (i.e. allowing CC-BY only where funders require it, or conversely, prohibit the use of CC-BY for industry-sponsored research, as has been shown for journals publishing medical and pharmaceutical research (Ellison et al, 2019)

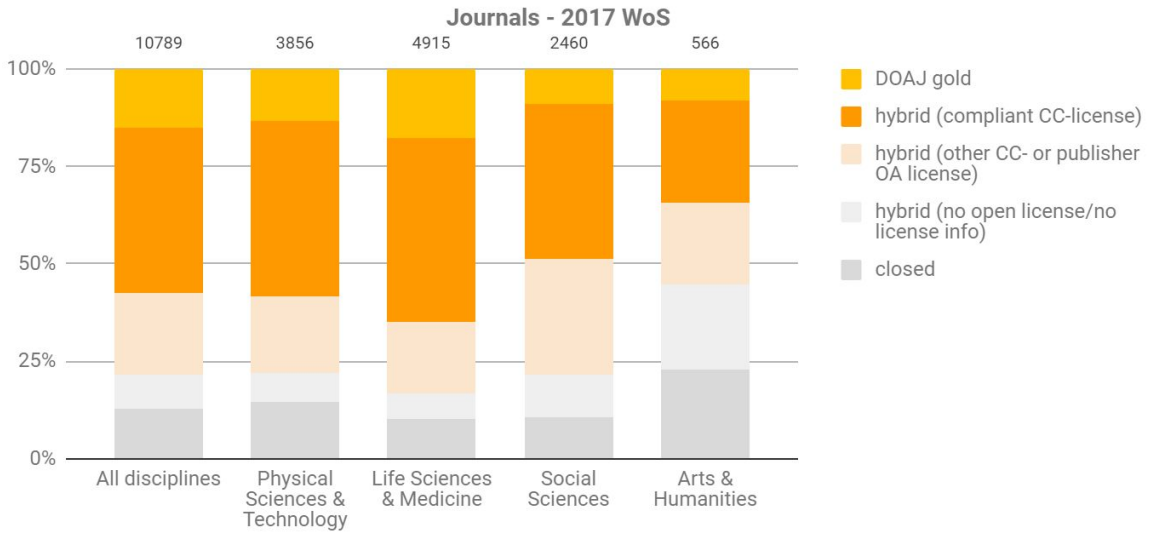


Fig. 4. Numbers and shares of hybrid journals offering Plan S compliant open licenses, total and main disciplines, 2017

3.4 Green OA - embargoes, licenses and copyright retention

Plan S stipulates that green OA is one way to be compliant, provided there is no embargo period and the version archived is the publisher version or the author accepted manuscript. As for all routes to compliance, copyright retention and a compliant CC-license are also required. Almost all hybrid journals and about half of the closed journals in our analysis do allow green OA archiving of publisher versions or author accepted manuscripts (see section 3.1). Information on embargo periods green for OA archiving was derived from full-text SHERPA/RoMEO policies (Fig. 5). Embargo periods were only included when specifically mentioned. The shortest embargo period mentioned was included in the analysis, also when that applied to e.g. one specific funder, because it indicates that the publisher is, at least under certain circumstances, prepared to allow this embargo. When a range of embargo periods was given, the lowest value was taken. The results show that in physical sciences & technology and life sciences & medicine, a 12 month embargo is most prevalent, with longer embargoes more common in social sciences and especially arts & humanities. At the same time, there are examples of journals with 0 month embargo in all fields. In social sciences particularly, a relatively large share of journals does not impose any embargo. Fully closed journals mostly do not allow green or have no embargo information available in the information sources used here. These data are also available per subdiscipline (see Figure D: Green OA - embargoes).

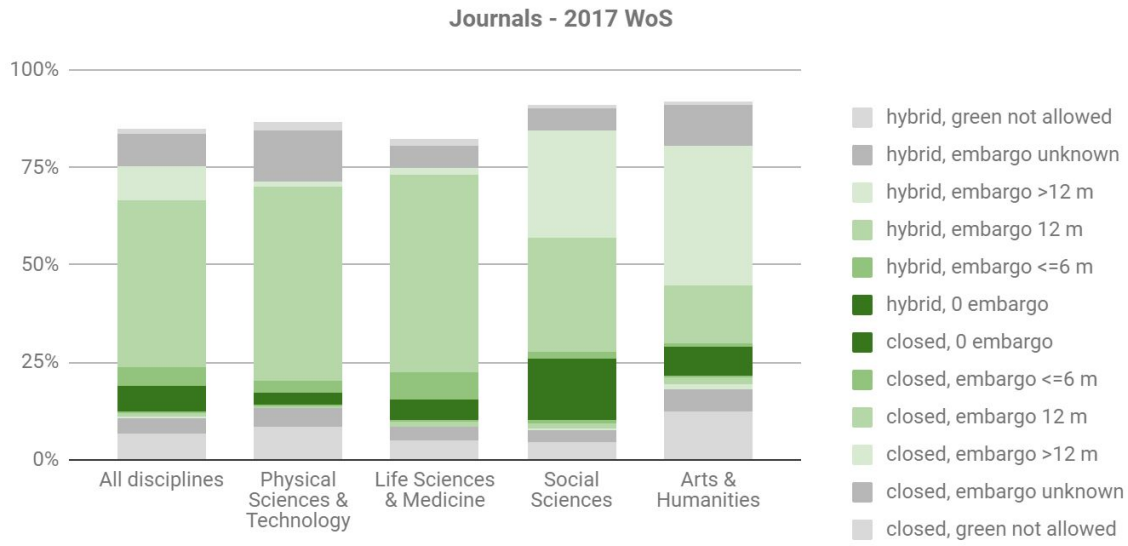
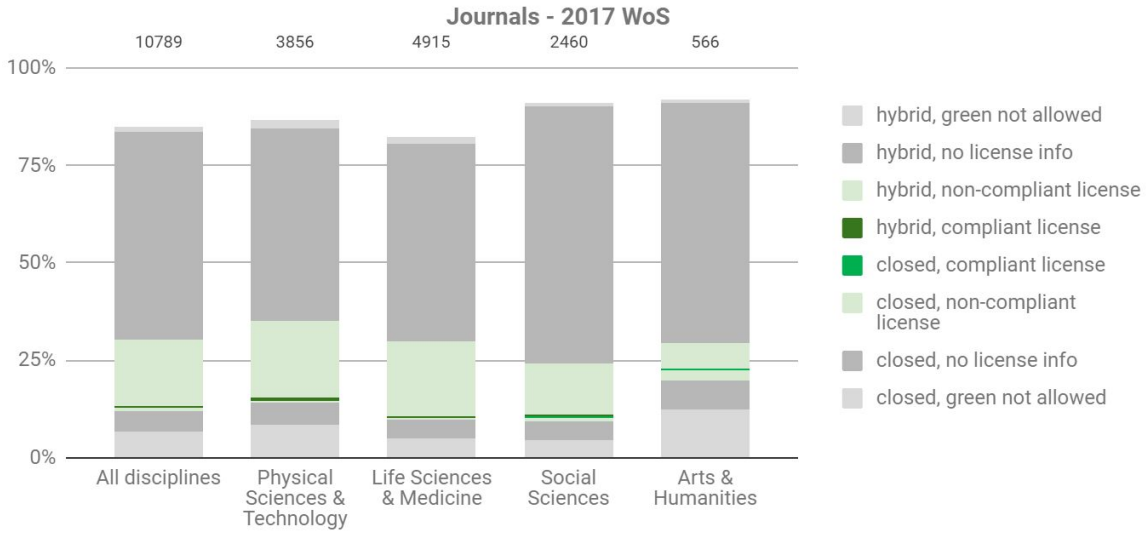


Fig. 5. Green OA embargo periods for hybrid and closed journals, total and main disciplines, 2017

SHERPA/RoMEO policies also can include information on CC-licensing for green OA archiving, as well as on copyright retention (Fig. 6). The results show that the availability of this information is currently limited and only a very small proportion of journals explicitly allow green archiving with a Plan S compliant license. The number of journals mentioning copyright retention by authors for green archiving is somewhat larger, and seems to be most prevalent in social sciences. These data are also available per subdiscipline (see Figure E: Green OA - licenses and Fig F: Green OA - copyright retention).



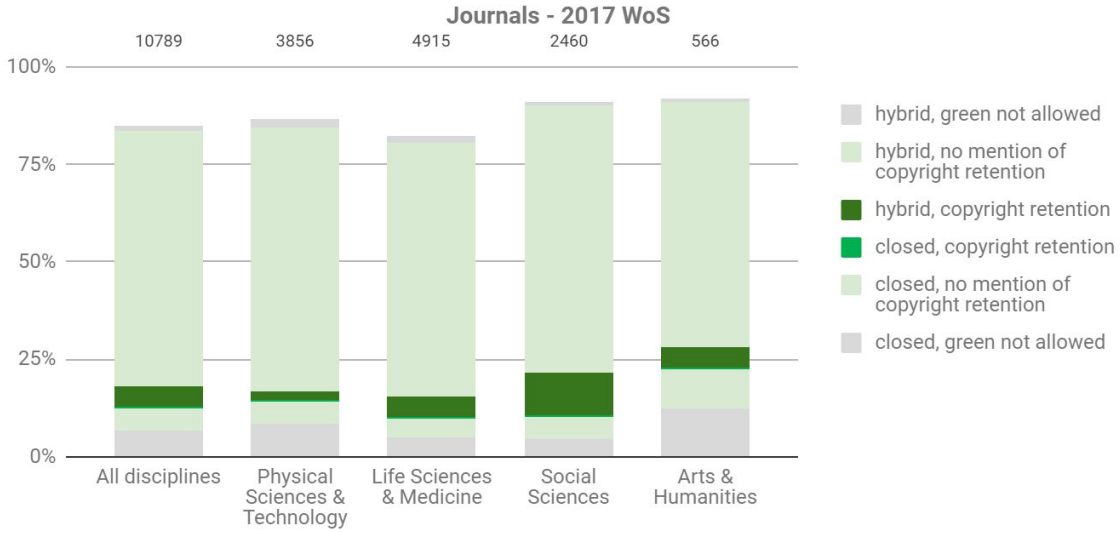


Fig 6. Compliant licenses and copyright retention for green OA in hybrid and closed journals, total and main disciplines, 2017

Publishing conditions like embargoes and license options are set by publishers. Generic policies of big publishers can affect up to thousands of journals and may have a big effect on patterns described here. E.g. Springer has a default embargo for green open access of 12 months while Sage and Emerald (as well as Cambridge University Press for social sciences) have a default embargo of 0 months. Especially if one or a few large publishers dominate article publication in a subdiscipline, just one or two policy changes can have profound effects on compliant routes in that field. Coalition S also has the ambition to develop a model License to Publish to ensure that authors or their institutions retain copyright and have the right to make either the published or the author accepted version immediately available under an open license.

3.5 Database options and recommendations

When interpreting this gap analysis, it should be kept in mind that the choice of databases and methodology used brings inherent limitations. In that sense, this gap analysis should be seen as a first step: an exploration in methodology as much as in results. In this section, we highlight some of these limitations (especially around the coverage of journals and articles), with detailed results provided in the Appendix. We also provide recommendations for future analysis and monitoring that can hopefully build upon and expand the work done here.

Regarding coverage, Web of Science has a known bias towards the sciences. The low numbers of journals and articles in certain fields in social sciences and almost all fields in the arts & humanities strongly limits the usefulness of the approach taken in this gap analysis for these fields. To inform a more comprehensive analysis of availability and usage of open access options in the social sciences and arts & humanities, an overview is provided of the extent to which social sciences and arts & humanities are covered in a number of additional databases (multidisciplinary ones as well as a few covering the broad arts & humanities field) (Appendix A3). Information on detection options in these databases is also provided, which could help (decisions on) further analysis (Appendix A4). Additionally, the opportunity to do analyses on publisher level could be explored more systematically. Patterns by publisher could prove valuable in explaining some of the differences in open access levels found, as well as in targeting policies.

Another aspect to address is bias in bibliographic databases such as Web of Science against newer (and smaller) journals, especially overlay journals and diamond (no-fee gold) OA journals. To assess the extent to which such journals are currently included in the various databases used, we looked at a sample of full gold OA journals, namely those included in the Open Library of Humanities (OLH), Free Journal Network (FJN), Episciences and Open Research Central (Appendix A5). As one way towards Plan S compliance is the creation and use of new publishing platforms (including diamond OA venues), it is important to include these platforms in any subsequent analysis of compliant publishing options, provided they meet the quality criteria set out by cOAlition S on editorial processes.

While it is possible to use various types of information on the same journals from different databases (as done here), this is time- and resource-intensive. Moreover, it inevitably affects the quality of information by bringing together information from disparate sources that might be incompletely or incorrectly matched. For a full, reliable gap analysis, it would be preferred to systematically collect and harmonize information (which can be derived from different sources) into one system, which could then be used for longitudinal analyses of both potential and usage of different OA options. Special attention should be given to inclusion of a broad spectrum of journals to prevent any structural biases in discipline, language or geography. In a study on differences between bibliographic databases and the implications for

quantitative indications that are derived from them, Huang et al. (2019) state that robust evaluation measures are needed to consider the effect of choice of data sources, and recommend an approach where data from multiple sources is integrated to provide a more robust dataset. This is also true for a full gap analysis that aims to do justice to open access developments in all fields and countries.

Inclusion of journals should be based on transparent quality criteria (including on editorial processes), such as those referred to by cOAlition S in the Plan S Principles and Implementation. We commend not to use perceived journal importance, such as selectivity on relevance as well as citation-based metrics, as criterion for inclusion of journals, in line with the commitment of cOAlition S to assess research based on the intrinsic merit of the work, rather than the publication venue.

4. Main disciplines - results and publication culture

This section briefly summarizes and contextualizes the quantitative findings for each of the four main fields distinguished in this study, and highlights marked differences between subdisciplines within each field. For each field, the narrative covers available options for open access publishing in general and usage thereof.

The data covered for each field include compliance with Plan S specific requirements on copyright retention, licenses and (for green OA) embargo periods, as far as could be determined from the sources used. As acknowledged in the section on methodology, it was not possible to include data on transformative arrangements. In these narratives, all shares are given as percentages; the dataset accompanying this report allows viewing the absolute numbers involved.

In addition to information about open access options, the narratives cover some aspects of publication cultures in the field, providing contextual information to enhance the interpretation of the analyses and identify potential for policy changes. The information on publication cultures includes the role of societies, the importance of languages other than English, typical numbers of co-authors and CC-licenses used. Finally, field-specific limitations of using Web of Science data as source are discussed. Similar narratives for 30 subdisciplines are provided in Chapter 6.

4.1 Physical sciences & technology

Available options for open access publishing
In physical sciences & technology there are 3856 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 13% are full gold DOAJ-accepted journals (7% compliant with both copyright retention and license requirements), while 72% are hybrid (45% compliant with license requirements). Of the journals included in this analysis, 6% only offer green open access and 8% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 4% had zero embargo explicitly mentioned in SHERPA/RoMEO.

The figures show that in physical sciences & technology, hybrid journals allowing green OA (regardless of embargo) constitute the majority. Without exception physical science and technology fields have all types of journals: fully open access, with and without APCs, hybrid and closed journals. The number of closed journals only allowing green OA is relatively low though. The most noteworthy differences between subdisciplines are the high number of full

gold OA journals in geology and optics and the relatively high numbers of closed journals in mathematics and astronomy.

Embargo lengths for green open access imposed in this field are typically 12 months, with remarkably few journals having either shorter or longer embargo periods.

Usage of open access options
There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 13% of all journals in this field, account for 22% of articles published. Another 75% of articles are published in hybrid journals, that in themselves make up 72% of all journals in this field. Within hybrid journals, of the 58152 articles published, 24% are gold open access. This is lower than the percentage observed for all disciplines as a whole (28%). Of the other, closed, papers in hybrid journals, 11% is available through green open access (self archiving in a repository), while 97% of hybrid journals in our sample allow green open access. While 42% of closed, subscription journals allow green open access, only 4% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

There are quite marked difference between the various subfields, especially in the ratio of papers in full OA journals to open access papers in hybrid journals: relatively low in engineering and mathematics, and relatively high optics and geology. Also noteworthy is the low level of openness in engineering and the rather high number of papers that are (only) available in green open access in mathematics. Compared to life sciences and medicine the uptake of open access in physical science is somewhat lower overall. Some physical sciences subdisciplines (astronomy, physics) show a high level of papers that are (only) green open access.

Some aspects of the publication culture
Societies play a very important role in this discipline, notably in the chemistry and astronomy subdisciplines.

In this discipline, publishing in non-English language journals is almost the default, though there are parts of some fields (e.g. Mathematics, Engineering, Geology) where other languages (e.g. German, Japanese and Russian) still play a substantial role.

The typical number of co-authors of a paper is quite varied ranging from low values in e.g. mathematics to extremely high values in journals for some areas of physics and astronomy. In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 5 to 121 but the bulk of journals has average author numbers between 3 and 8.

Some parts of physical sciences & technology are special in that preprints and the preprint platform ArXiv play a central role. This holds especially for physics, astronomy, mathematics and computer science. The effect of this in the data of journals and open access uptake are limited though, as can be seen by comparing physics (where preprints play a central role) with chemistry (where preprints are still quite rare). There is only a slightly larger share of green OA in physics, suggesting that there is no pervasive practice of updating preprints with accepted manuscripts, or alternatively, that such updates in ArXiv are not accurately detected.

The analysis in this report is primarily based on Web of Science data. For physical sciences & technology this has no strong apparent limitations overall, but there are issues with the coverage of publication venues in mathematics and computer science (conference proceedings).

Using the LENS database, we found that 36.7% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.1% a CC-BY-ND license (using ASJC subject categories in LENS).

4.2 Life sciences & medicine

Available options for open access publishing
In life sciences & medicine there are 4915 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 18% are full gold DOAJ-accepted journals (10% compliant with both copyright retention and license requirements), while 72% are hybrid (47% compliant with license requirements). Of the journals included in this analysis, 6% only offer green open access and 5% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 7% had zero embargo explicitly mentioned in SHERPA/RoMEO.

The figures show that in life science hybrid journals allowing green OA (regardless of embargo) constitute the majority. But they also show that all subdisciplines have all types of journals: fully open access, with and without APCs, hybrid and closed journals. Of the four main disciplines life sciences overall has the largest numbers of full OA journals and the smallest number, relatively, of journals that have no OA option at all. Differences between subdisciplines are quite small in terms of types of journals though biochemistry and molecular biology and environmental science have somewhat low numbers of full OA journals.

Embargo lengths for green open access imposed in this field are typically 12 months, though there are also many journals with a shorter (0-6 months) embargo for self archiving in repositories.

Usage of open access options
There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 18% of all journals in this field, account for 22% of articles published. Another 75% of articles are published in hybrid journals, that in themselves make up 72% of all journals in this field. Within hybrid journals, of the 46212 articles published, 35% are gold open access. This is higher than the percentage observed for all disciplines as a whole (28%). Of the other, closed, papers in hybrid journals, 12% is available through green open access (self archiving in a repository), while 98% of hybrid journals in our sample allow green open access. While 54% of closed, subscription journals allow green open access, only 15% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Compared to the other three main disciplines life science and medicine does quite well regarding uptake of open access. However, there are notable differences between the various subdisciplines as to the uptake of full open access journals especially. Specifically, pharmacology and environmental science show lower numbers of open articles, especially articles in full OA journals. Microbiology and genetics ‘lead’ in terms of shares of open access published articles, mainly because of high numbers of publications in full OA journals.

Some aspects of the publication culture
Societies play a relatively important role in this discipline and most of its subdisciplines, with many quite specialised organizations owning journals, sometimes managed and published by large commercial publishers.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is quite rare.

The typical number of co-authors of a paper across the board is quite high, though without the extremes found in some of the physical sciences. In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 6 to 18. The bulk of journals seems to have average author numbers of 5 to 12.

Some parts of life sciences & medicine are special in that funder mandates for green OA archiving play a central role, especially in biomedical sciences. Many journals in the biomedical field have policies regarding funder-mandated archiving in PubMedCentral, which is often publisher-mediated. The fact that the proportion publications available as green OA is nonetheless limited might be an effect of embargoes (which is 12 months for NIH-funded research), or of limited detection of accepted manuscripts (or publisher versions) in PubMedCentral. This would require further analysis.

The analysis in this report is primarily based on Web of Science data. For life science and medicine this has few limitations as most important journals seem to be covered.

Using the LENS database, we found that 39.1% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.1% a CC-BY-ND license (using ASJC subject categories in LENS).

4.3 Social sciences

Available options for open access publishing
In social sciences there are 2460 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 9% are full gold DOAJ-accepted journals (4% compliant with both copyright retention and license requirements), while 81% are hybrid (40% compliant with license requirements). Of the journals included in this analysis, 6% only offer green open access and 4% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 19% had zero embargo explicitly mentioned in SHERPA/RoMEO.

The figures show that in the social sciences hybrid journals allowing green OA (regardless of embargo) constitute the majority. This holds for all subdisciplines, but it is also true that all types of journals are present in all subdisciplines, though some fields have very small numbers of full OA journals: public administration, sociology, government and law and history. Within this group of subdisciplines geography has a remarkably high number of full OA journals Full gold journals are less common than in life science and physical sciences.

Embargo lengths for green open access imposed in this field are typically in the range of 12-24 months, with big difference between publishers. Journals at Sage, Emerald and Cambridge University Press have a zero embargo. This contributes to a remarkable high share of zero embargo journals compared to the 3 other main disciplines.

Usage of open access options
There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 9% of all journals in this field, account for 10% of articles published. Another 85% of articles are published in hybrid journals, that in themselves make up 81% of all journals in this field. Within hybrid journals, of the 9706 articles published, 24% are gold open access. This is lower than the percentage observed for all disciplines as a whole (28%). Of the other, closed, papers in hybrid journals, 10% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow

green open access. While 57% of closed, subscription journals allow green open access, only 7% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version). Looking at subdisciplines, psychology and somewhat less geography have relatively high levels of open access publishing, while business and economic, government and law and public administration show lower open access levels.

Some aspects of the publication culture
Societies overall play a modest role in this discipline, though this varies of course by subdiscipline. Also, in many cases society journals or managed and/or published by commercial publishers. Apart from journal ownership and publishing societies may be influential in setting mainstream disciplinary culture (e.g. APA).

In this field, publishing in non-English language journals, though becoming less common in Europe, is still important in some subfields (notably law, but others as well), especially those with many studies focussing on local and national social, legal and policy contexts.

The typical number of co-authors of a paper is quite low, ranging from 1.5 to 3, with a modest group of journals, especially in psychology, education and linguistics having higher average numbers, between 3 and 8.

The analysis in this report is primarily based on Web of Science data. For social sciences this has some limitations. This is because of relatively low numbers of journals, especially for subdisciplines that have a long tail of smaller, non-English and/or nationally active journals.

Using the LENS database, we found that 31.8% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.3% a CC-BY-ND license (using ASJC subject categories in LENS).

4.4 Arts & humanities

Available options for open access publishing
In Arts & Humanities there are 566 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 8% are full gold DOAJ-accepted journals (3% compliant with both copyright retention and license requirements), while 69% are hybrid (26% compliant with license requirements). Of the journals included in this analysis, 10% only offer green open access and 12% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 10% had zero embargo explicitly mentioned in SHERPA/RoMEO.

The figures show that in arts & humanities hybrid journals allowing green OA (regardless of embargo) constitute the majority. Low overall numbers and relatively low coverage of A&H subdisciplines make it problematic to give details for all these fields, but almost without exception all fields do have all the types of journals: fully open access, with and without APCs, hybrid and closed journals. Full OA DOAJ listed journals are more scarce in arts & humanities fields than elsewhere and closed journals are on average more frequent. Philosophy and history and not far apart in terms of type of journals. Their distribution is quite like that in sociology.

Embargo lengths for green open access imposed in this field are typically in the range of 24-36 months, except where publishers have a generic embargo length for all their journals, such as the 0 month embargo at Sage and Cambridge University Press.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 8% of all journals in this field, account for 8% of articles published. Another 77% of articles are published in hybrid journals, that in themselves make up 69% of all journals in this field. Within hybrid journals, of the 993 articles published, 28% are gold open access. This is equal to the percentage observed for all disciplines as a whole (28%). Of the other, closed, papers in hybrid journals, 13% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 46% of closed, subscription journals allow green open access, only 4% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version). Levels of open access publishing in open and hybrid publishing are not very different from those in social sciences. It is surprising to see that history has markedly higher levels of green OA sharing than philosophy, than can not be caused by higher numbers of journals allowing green OA.

Some aspects of the publication culture

Societies play a very important role in this field, with many very specialised, often small and active in niches. Some fields, such as history, do have larger societies though. The importance of language and local cultures also make that many societies have not become international, again with exceptions.

In this field, publishing in non-English language journals is very common, often essential, related to the object of study (languages, locally and nationally defined culture) and the language defined discourse on many topics.

The typical number of co-authors of a paper is quite low. Typically articles are single authored. In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field as a whole as well as per subdiscipline, the average number of co-authors of a paper mostly varies

from 1 to 3, with only a few journals (e.g. in the field of Art), having a higher average number of co-authors (4 to 6).

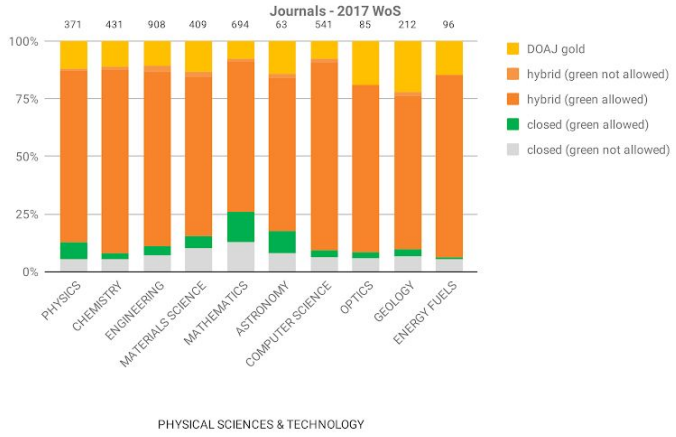
The analysis in this report is primarily based on Web of Science data. For arts & humanities this has strong limitations. This is because of relatively low numbers of journals covered and the focus on English-language journals. This does not do enough justice to the regional and language diversity of journals in the discipline (see also Mongeon & Paul-Hus (2016, paywalled)) For subdisciplines especially it becomes hazardous and creates false precision to present shares of types of journals. This description at the wider discipline level does in itself not suffer from low absolute numbers, but does of course suffer from neglecting the diversity of the discipline, also with regard to open access options and uptake.

Using the LENS database, we found that 26.3% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.7% a CC-BY-ND license (using ASJC subject categories in LENS).

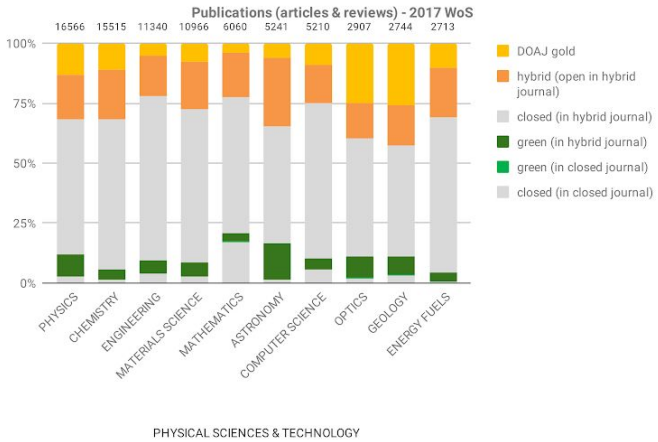
5. Subdisciplines - results visualization

This chapter shows the results at the level of subdisciplines for all aspects of open access used in this analysis, shown here for easy comparison. They underpin much of the descriptions of open access options, publishing behaviour and venue compliance at the level of main disciplines (Chapter 4) and subdisciplines (Chapter 6).

A. Open access options and usage



PHYSICAL SCIENCES & TECHNOLOGY



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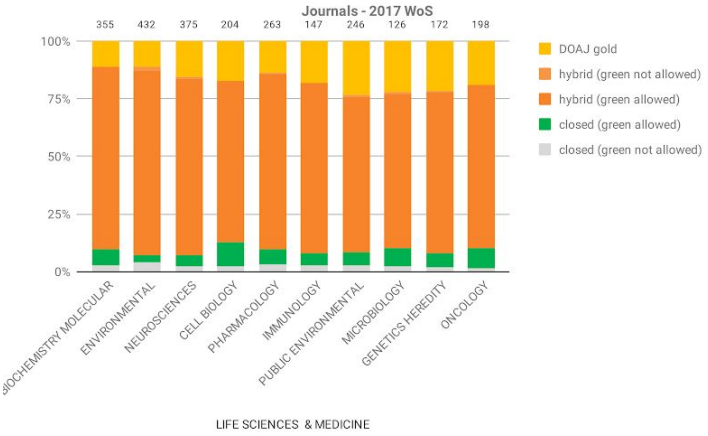
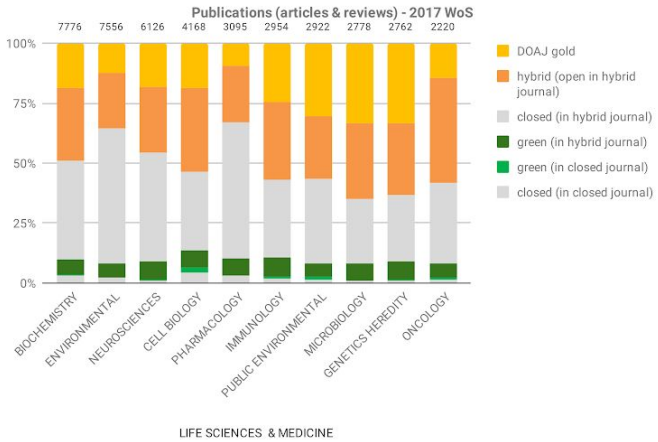


LIFE SCIENCES & MEDICINE



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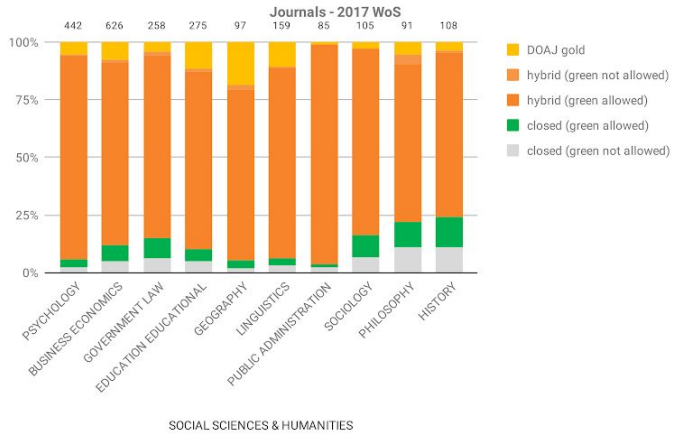
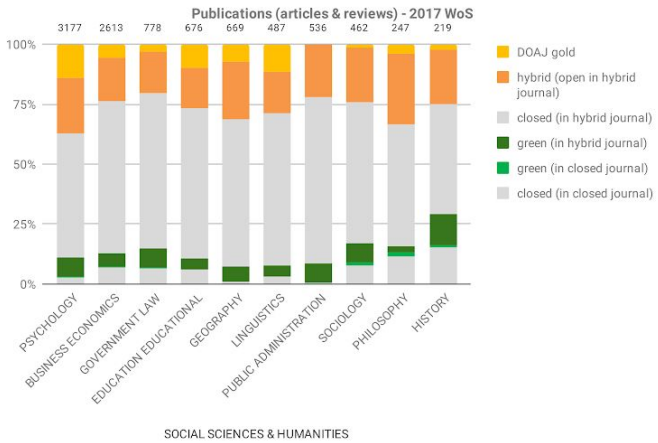
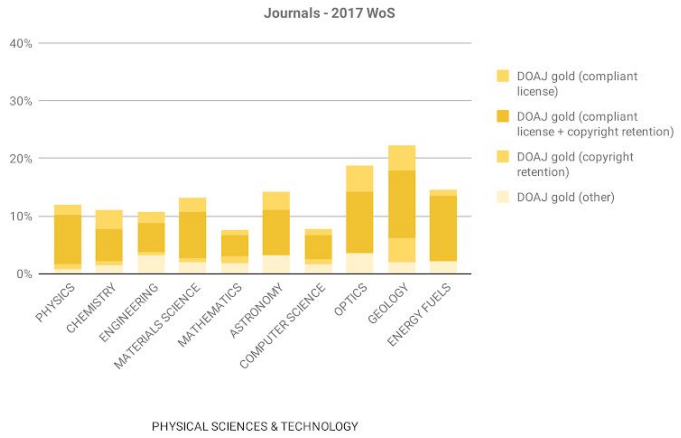


SOCIAL SCIENCES & HUMANITIES



SOCIAL SCIENCES & HUMANITIES

B. Full gold OA journals - CC licenses & copyright retention



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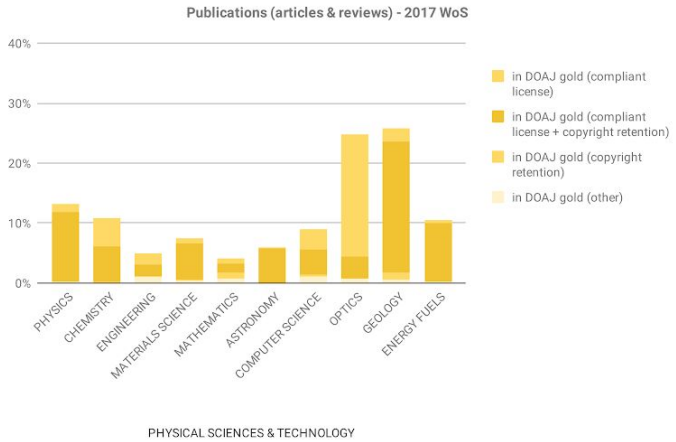

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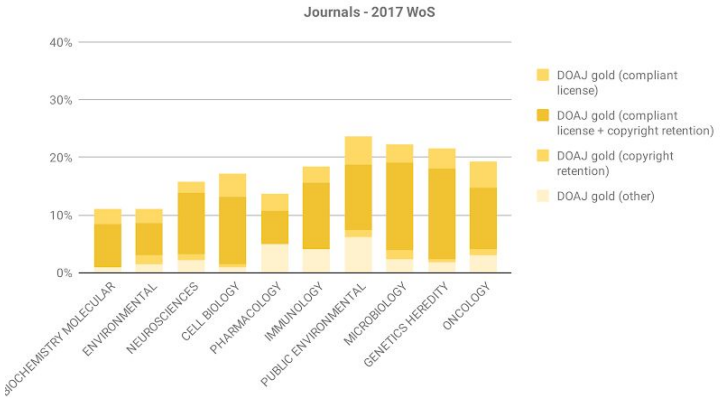

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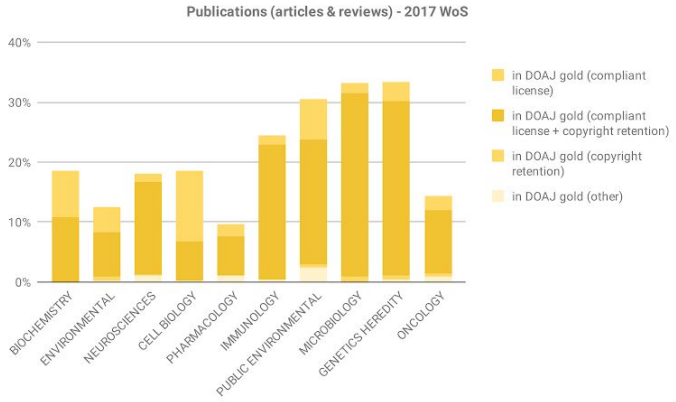
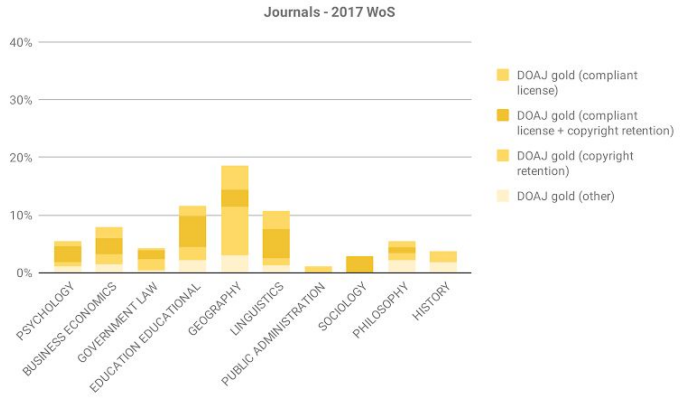
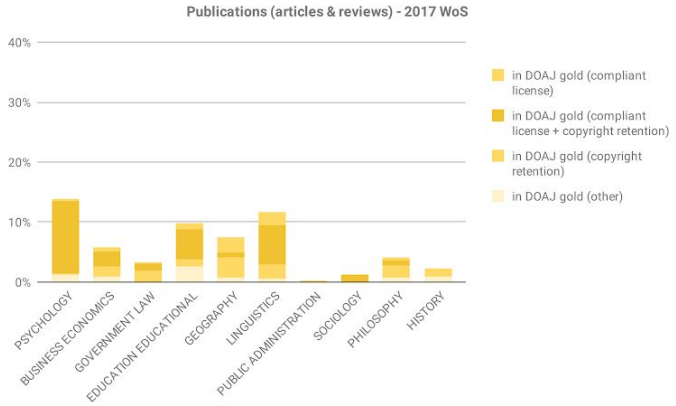


LIFE SCIENCES & MEDICINE

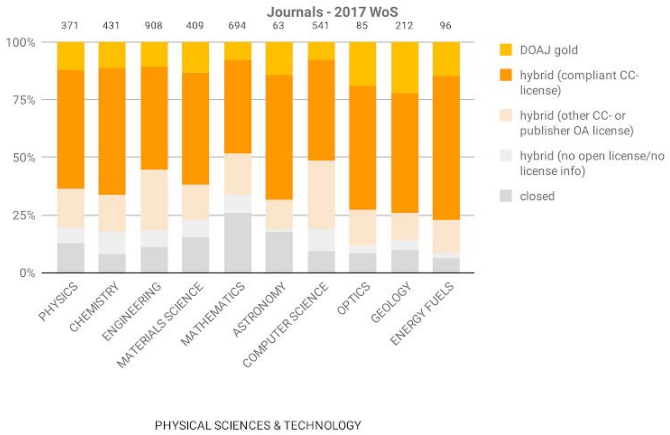


SOCIAL SCIENCES & HUMANITIES

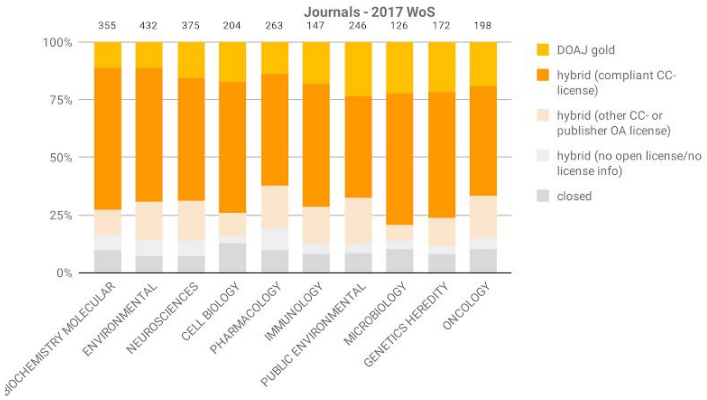


SOCIAL SCIENCES & HUMANITIES

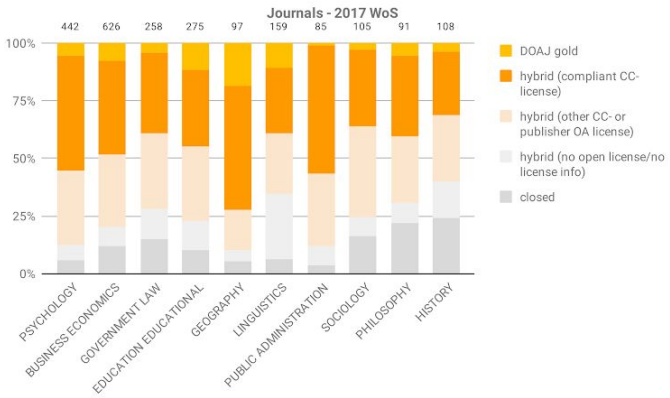
C. Hybrid journals - licenses



PHYSICAL SCIENCES & TECHNOLOGY

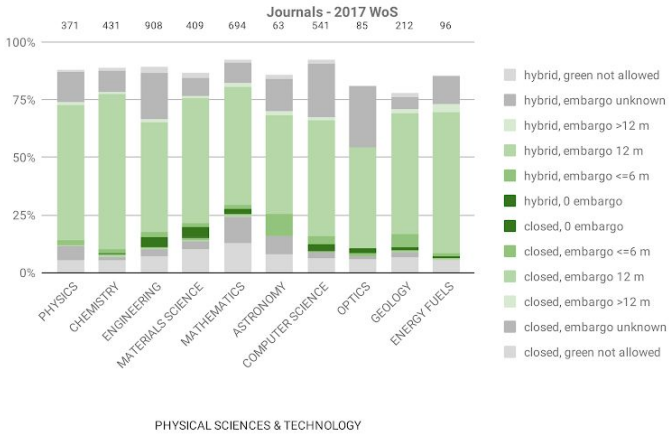


LIFE SCIENCES & MEDICINE

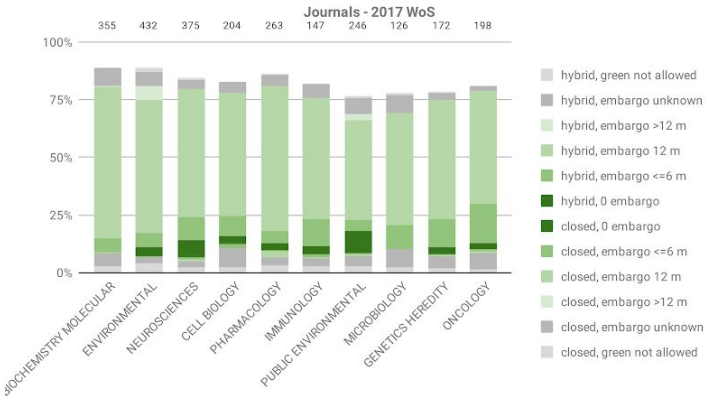


SOCIAL SCIENCES & HUMANITIES

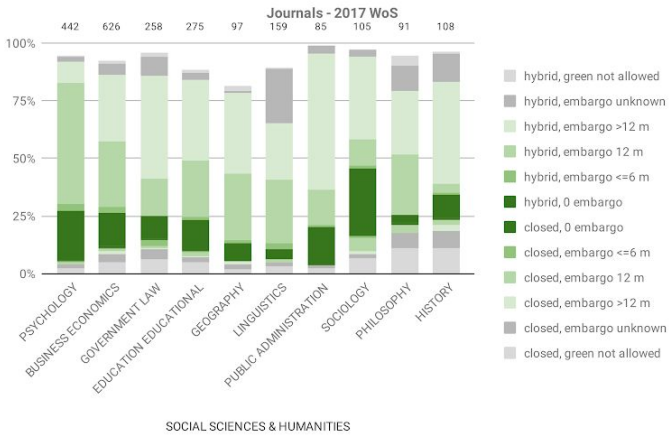
D. Green OA - embargoes



PHYSICAL SCIENCES & TECHNOLOGY

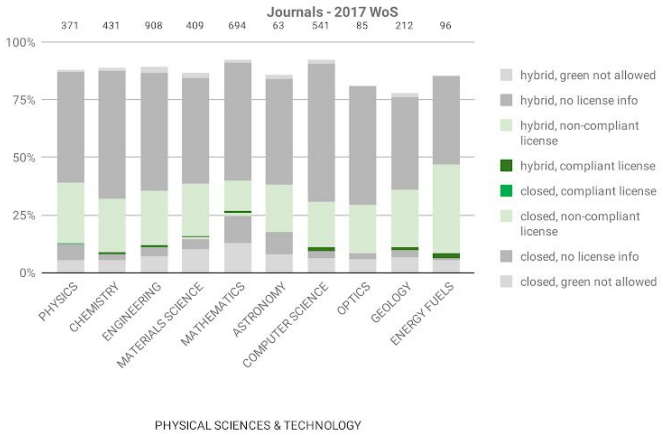


LIFE SCIENCES & MEDICINE

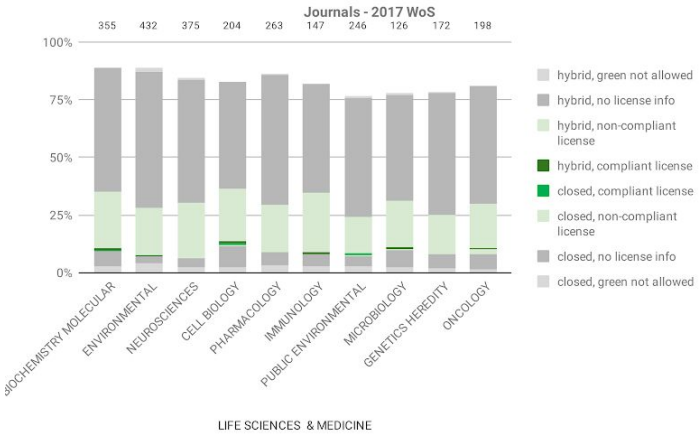


SOCIAL SCIENCES & HUMANITIES

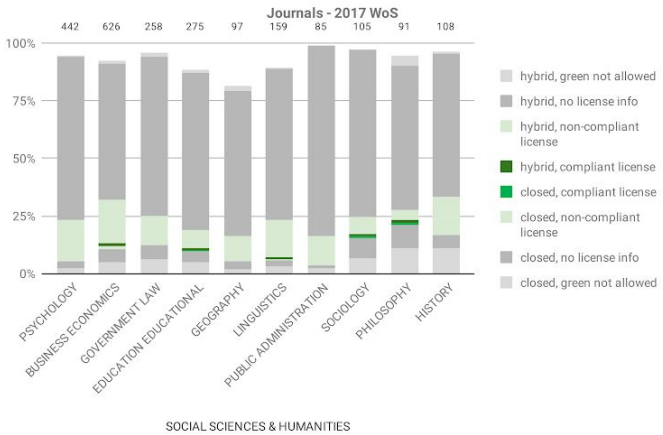
E. Green OA - licenses



PHYSICAL SCIENCES & TECHNOLOGY

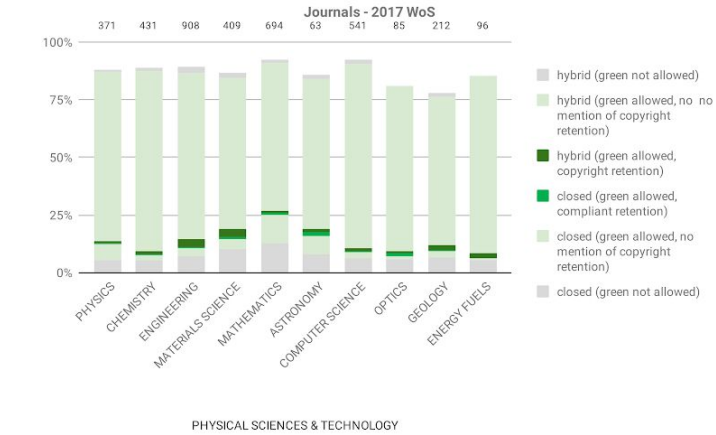


LIFE SCIENCES & MEDICINE

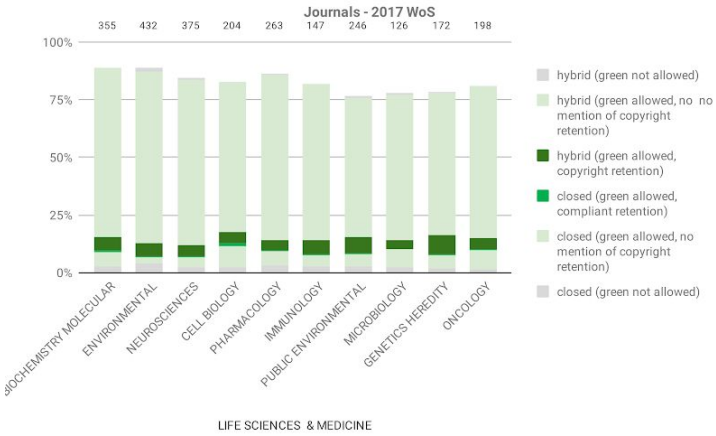


SOCIAL SCIENCES & HUMANITIES

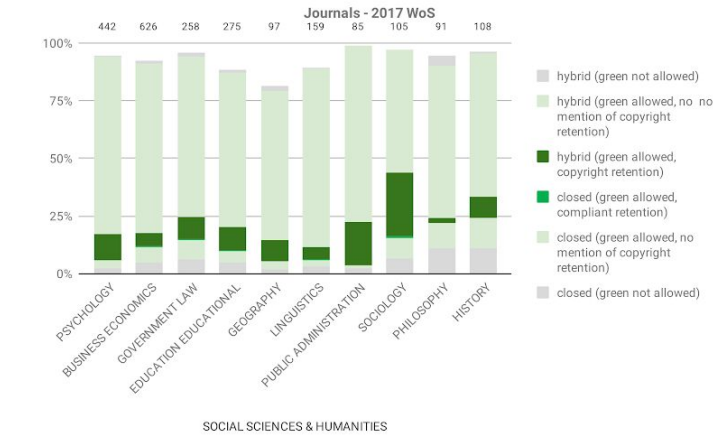
F. Green OA - copyright retention



PHYSICAL SCIENCES & TECHNOLOGY



LIFE SCIENCES & MEDICINE



SOCIAL SCIENCES & HUMANITIES

6. Subdisciplines - results and publication culture

This section summarizes and contextualizes the quantitative findings for each of the 30 subdisciplines in this study. For each subdiscipline, the narrative covers available options for open access publishing and usage thereof, with some examples of journals and publishers.

The data covered in each narrative include compliance with Plan S specific requirements on copyright retention, licenses and (for green OA) embargo periods, as far as could be determined from the sources used. As acknowledged in the section on methodology, it was not possible to include data on transformative agreements. In these narratives, all shares are given as percentages; the dataset accompanying this report allows viewing the absolute numbers involved.

In addition to information about open access options, the narratives cover some aspects of publication culture in the field, providing contextual information to enhance the interpretation of the analyses and identify potential for policy changes. The information on publication cultures includes the role of societies, the importance of languages other than English, typical numbers of co-authors and CC-licenses used. Finally, field-specific limitations of using Web of Science data as source are discussed. APC amounts quoted in this section were taken from publishers' websites in May/June 2019.

PHYSICS

Available options for open access publishing

In physics there are 371 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 12% are full gold DOAJ-accepted journals (9% compliant with both copyright retention and license requirements), while 75% are hybrid (52% compliant with license requirements). Of the journals included in this analysis, 7% only offer green open access and 5% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, less than 1% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are the *Journal of High Energy Physics*, *Journal of Physics Communications*, *European Physical Journal C*, and *SciPost*. Most of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are the American Institute of Physics with *Structural Dynamics*, the American Physical Society with *Physical Review X*, Elsevier Science with *Nuclear Physics B* (funded by the SCOAP3 Consortium), and Springer with *Journal of High Energy Physics*. Examples of

OA-only journal publishers active in the field are Hindawi and MDPI. An example of a widely known diamond (zero APC-) publisher is SciPost.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *The European Physical Journal B,* (Springer, €1800) and *Journal of Physics A: Mathematical and Theoretical,* (IOP Science, €2250).

Embargo lengths for green open access imposed in this field are typically in the range of 12 - 24 months *(e.g.* Elsevier's *Annals of Physics* 24 months *and* Taylor & Francis' *Molecular Physics* 12 months.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 12% of all journals in this field, account for 13% of articles published. Another 84% of articles are published in hybrid journals, that in themselves make up 75% of all journals in this field. Within hybrid journals, of the 13919 articles published, 22% are gold open access. This is about equal to the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 14% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 57% of closed, subscription journals allow green open access, only 4% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are American Physical Society (5 OA journals) and the European Physical Society (with some of their own journals but mainly by recognizing other European journals, many of which are completely open access, such as *Acta Physica Polonica A* or the *Romanian Journal of Physics*).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 3 to 121. For papers with more than one author, most are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are the SCOAP3 consortium that sponsors open access publishing in Particle Physics, including for instance a journal in the field of Physics, Hindawi-Springer/*The Journal of High Energy Physics*, which is an overlay journal for arXiv. Depositing Physics preprints to arXiv already started in the 90's when arXiv was launched (arXiv 2019). To much of the physics community, sharing on the arXiv is the main way to make results public. It is not exactly clear though to what extent preprints are updated to the last submitted version, to the accepted author manuscript or to the version of record. Another trait of physics in relation to open access is that some large publishers make the journal contents free to read (though mostly not open licensed) after e.g. 12 months.

The analysis in this report is primarily based on Web of Science data. For this subdiscipline this has no strong limitations.

Using the LENS database, we found that 42% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

CHEMISTRY

Available options for open access publishing

In chemistry there are 431 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 11% are full gold DOAJ-accepted journals (6% compliant with both copyright retention and license requirements), while 81% are hybrid (55% compliant with license requirements). Of the journals included in this analysis, 3% only offer green open access and 5% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 1% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Chemical Science* and *RSC Advances* (both from RSC), *Sensors* (MDPI) and *ACS Omega* (ASC). Few of the (other) largest traditional publishers in this field have full gold open access journals; one example is *ChemistryOpen* (Wiley). Examples of more widely known diamond (zero APC-) journal are *Beilstein Journal of Organic Chemistry* (Beilstein Institute) and *ARKIVOC* (Archives of Organic Chemistry). *Nanoscale Advances* from RSC, which is new and therefore possibly not yet in WoS, is waiving APC's until mid-2021.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Angewandte Chemie International Edition* (Wiley/ChemPubSoc Europe, €4000), *Physical Chemistry Chemical Physics* (RSC, £1600 APC) and the *Journal of the American Society of Chemistry* (ACS, $2000-$4000 APC, with additional $500-$1000 for CC-license).

Embargo lengths for green open access imposed in this field are typically 12 months (e.g. ACS, RSC, ChemPubSoc, Elsevier).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 11% of all journals in this field, account for 11% of articles published. Another 88% of articles are published in hybrid journals, that in themselves make up 81% of all journals in this field. Within hybrid journals, of the 13607 articles published, 24% are gold open access. This is about equal to the percentage observed for physical

sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 6% is available through green open access (self archiving in a repository), while 98% of hybrid journals in our sample allow green open access. While 34% of closed, subscription journals allow green open access, only 11% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a very important role in this field. A few societies with their number of full open access journals are ACS with 55 Journals with 2 full open access journals and Royal Society of Chemistry with 46 Journals of which 3 are fully open access.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 4 to 8. For papers with more than one author, many are co-authored by researchers from multiple organizations.

A development in this field that is relevant for open access uptake is the cautious opening up to preprints, with the launch of ChemRxiv by the large chemical societies (ACS, RSC and GDCh). Among ACS journals, the *Journal of the American Chemical Society* (JACS) is the first (and so far only) journal allowing authors to update the preprint version up until the manuscript is accepted for publication.

The analysis in this report is primarily based on Web of Science data. For Chemistry his has no specific limitations other than the general bias of Web of Science against non-Western, non-English language and recently launched journals.

Using the LENS database, we found that 48% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

ENGINEERING

Available options for open access publishing

In engineering there are 908 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 11% are full gold DOAJ-accepted journals (5% compliant with both copyright retention and license requirements), while 78% are hybrid (45% compliant with license requirements). Of the journals included in this analysis, 4% only offer green open access and 7% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 6% had zero embargo explicitly mentioned in SHERPA/RoMEO.

A well known fully open access journal is *IEEE Access*. Some of the other largest traditional publishers have full gold open access journals specific to this field. A few examples of the publishers/titles are SpringerNature with *EURASIP Journal on Wireless Communications and Networking* and Sage with *Adsorption Science Technology*. Examples of OA-only journal publishers are Biomed Central (e.g. *Journal of Neuroengineering and Rehabilitation*, *Biomedical Engineering Online*), Hindawi (*Wireless Communications Mobile Computing*, *Mathematical Problems in Engineering*) and MDPI (*Processes*, *Technologies*, *Electronics*). Examples of diamond (zero APC-) journals in our sample are *Engineering Science and Technology, an International Journal* (Elsevier) and *Journal Of Modern Power Systems and Clean Energy* (SpringerNature). However, these latter journals currently have few published articles from cOAlionS/EC/ERC funded research.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Applied Energy* (Elsevier, APC $3650), *Environmental Science Technology* (ASC, $2000-$4000 with an additional $500-$1000 for a CC-license) and a number of IEEE journals (APC $2045).

Embargo lengths for green open access imposed in this field are typically 12 months, but a number of journals, for instance those of Emerald, allow zero embargo.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 11% of all journals in this field, account for 5% of articles published. Another 91% of articles are published in hybrid journals, that in themselves make up 78% of all journals in this field. Within hybrid journals, of the 10330 articles published, 19% are gold open access. This is lower than the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 7% is available through green open access (self archiving in a repository), while 97% of hybrid journals in our sample allow green open access. While 37% of closed, subscription journals allow green open access, only 3% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field, most notably IEEE, which currently has 6 (of >100) journals that are full open access, with 14 more to be launched in 2020.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is common in many countries, including many Eastern European countries.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 3 to 7. For papers with more than one author, many are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are that much research in Engineering is practice-oriented and often published in advertising-financed journals. Also, research in this field is often nationally, rather than internationally oriented. (Open-access.net 2019). IEEE is a major publisher in this field, and thus OA developments at that publisher (such as embargo periods, APC levels and the launch of new OA journals) will have a large influence on publishing practices in engineering.

The analysis in this report is primarily based on Web of Science data. For Engineering this has some limitations. This is because the field is wide, with many specializations within the subdiscipline that overlap with other subdisciplines. Also, many local (nationally oriented) journals will not be included in Web of Science.

Using the LENS database, we found that 32.0% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.1% a CC-BY-ND license (using ASJC subject categories in LENS).

MATERIALS SCIENCE

Available options for open access publishing

In materials science there are 409 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 13% are full gold DOAJ-accepted journals (8% compliant with both copyright retention and license requirements), while 71% are hybrid (49% compliant with license requirements). Of the journals included in this analysis, 5% only offer green open access and 10% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 6% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Materials and Applied Sciences* (both MDPI) and *AIP Advances* (AIP). Most of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are Springer (*Nanoscale Research Letters*), Walter de Gruyter (*Nanophotonics*) and the Optical Society of America (*Optical Materials Express*). MDPI is the most-used OA-only journal publisher. An example of a diamond (zero APC-) journals in this field is *Beilstein Journal Of Nanotechnology* (Beilstein Institute).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Physical Review B* (American Physical Society, APC $2200), *ACS Applied Materials Interfaces* (ACS, $2000-$4000 with additional $500-$1000 for CC-license), *Journal of Alloys and Compounds* (Elsevier, $3200) and *Advanced Materials* (Wiley, $5000).

Embargo lengths for green open access imposed in this field are typically 12 months, but a few journals, including those of Emerald, allow zero embargo.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 13% of all journals in this field, account for 8% of articles published. Another 90% of articles are published in hybrid journals, that in themselves make up 71% of all journals in this field. Within hybrid journals, of the 9839 articles published, 22% are gold open access. This is about equal to the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 9% is

available through green open access (self archiving in a repository), while 97% of hybrid journals in our sample allow green open access. While 35% of closed, subscription journals allow green open access, only 7% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are the Americal Physical Society (APS, 6 out 14 journals full OA), the American Chemical Society (ACS, 2 our of 55 journals full OA) and the Royal Society of Chemistry (RSC, 3 out of 45 journals full OA).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is relatively rare (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 5 to 8. For papers with more than one author, many are co-authored by researchers from multiple organizations.

What is also relevant for open access uptake is that the field of Material Sciences covers both Physics and Chemistry, with a large role (in publishing) of the large chemical societies.

The analysis in this report is primarily based on Web of Science data. For Material Sciences this has no specific limitations other than the general bias of Web of Science against non-Western, non-English language, and recently launched journals.

Using the LENS database, we found that 31% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

MATHEMATICS

Available options for open access publishing

In mathematics there are 694 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 8% are full gold DOAJ-accepted journals (4% compliant with both copyright retention and license requirements), while 66% are hybrid (41% compliant with license requirements). Of the journals included in this analysis, 13% only offer green open access and 13% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 3% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Well known fully open access journals are *The Electronic Journal of Combinatorics* (E-JC) and *Transactions of the London Mathematical Society* (Wiley). Most of the largest traditional publishers in this field have a few full gold open access journals. A few examples of the publishers/titles are European Mathematical Society/*Algebraic Geometry* (owned by the Foundation Compositio Mathematica), SpringerOpen/*Boundary Value Problems*. An examples of a more widely known diamond (zero APC-) journal is *Discrete Mathematics & Theoretical Computer Science* (Episciences).

Quite some of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Journal of Algebra* (Elsevier, USD 1600) and *Journal on Scientific Computing* (SIAM, USD 2500).

Embargo lengths for green open access imposed in this field are typically in the range of 0 - 12 months. American Mathematical Society*/Conformal Geometry and Dynamics* has a 0 month embargo, Taylor & Francis' *Econometric Reviews* also has 0 months, Elsevier's *Annales de l'Institut Henri Poincaré C, Analyse non linéaire* has a 2 month embargo and Springer's *Analysis Mathematica* asks 12 months.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 8% of all journals in this field, account for 4% of articles published. Another 78% of articles are published in hybrid journals, that in themselves make up 66% of all journals in this field. Within hybrid journals, of the 4753 articles published,

23% are gold open access. This is equal to the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 5% is available through green open access (self archiving in a repository), while 98% of hybrid journals in our sample allow green open access. While 51% of closed, subscription journals allow green open access, only 2% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are American Mathematical Society (2), European Mathematical Society (some journals closed, others have a moving wall of several years beyond which articles are free to read.

In this field, publishing in non-English language journals is common; examples are journals in languages which are also read and published in outside these countries. Mostly German (*Elemente der Mathematik, Journal für die reine und angewandte Mathematik*), French (*Annales scientifiques de l'École normale supérieure, Publications mathématiques de l'IHÉS*), and Italian (*Bollettino dell'Unione Matematica Italiana*).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 2 to 5. For papers with more than one author, many are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are journals which started as overlay journals for the arXiv such as *Discrete Analysis* (not in the list), which is now also accepting submissions. The Discrete Analysis website also mentions some other new journals with no charges for authors or readers: *The Épijournal de Géometrie Algébrique*, *Annales Henri Lebesgue,*, *Internet Mathematics*, and *Algebraic Combinatorics*.

The analysis in this report is primarily based on Web of Science data. For Mathematics this has quite strong limitations. This is because quite a number of small journals from small publishers are open access but unknown to WoS.

Using the LENS database, we found that 25.9% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.1% a CC-BY-ND license (using ASJC subject categories in LENS).

ASTRONOMY & ASTROPHYSICS

Available options for open access publishing

In astronomy & astrophysics there are 63 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 14% are full gold DOAJ-accepted journals (8% compliant with both copyright retention and license requirements), while 68% are hybrid (54% compliant with license requirements). Of the journals included in this analysis, 10% only offer green open access and 8% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, none had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Physics Letters B, Galaxies* and *Frontiers in Astronomy and Space Sciences*. Most of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are Elsevier (*Physics Letters B*) and Springer (*Living Reviews in Solar Physics*). Only one of the largest publishers in this field has full gold open access journals. Examples of OA-only journal publishers are Frontiers Media SA, Copernicus Publications. The most widely known diamond (zero APC-) journal is *Physics Letters B* (Elsevier Science; funded by the SCOAP3 Consortium). An example of a widely known diamond (zero APC-) publisher is SciPost (that has astronomy articles in a physics journal and is a journal based on preprints in arXiv).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Monthly Notices of the Royal Astronomical Society* (Oxford UP, 2345 EUR), *Astronomy and Astrophysics* (EDP Sciences, 1500 EUR) and *Physical Review D* (American Physical Society, 2200 USD).

Embargo lengths for green open access imposed in this field are typically in the range of 0 - 12 months, where several important journals like *Monthly Notices of the Royal Astronomical Society* and *Astronomy and Astrophysics* allow archiving of the version of record immediately upon publication.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 14% of all journals in this field, account for 6% of articles published. Another 93% of articles are published in hybrid journals, that in themselves make up 68% of all journals in this field. Within hybrid journals, of the 4851 articles published, 31% are gold open access. This is higher than the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 23% is available through green open access (self archiving in a repository), while 98% of hybrid journals in our sample allow green open access. While 55% of closed, subscription journals allow green open access, only 1% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are the Royal Astronomical Society (no full OA journals) and the American Physical Society (5 full OA journals, but not in the field of Astronomy and Astrophysics).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 3 to 151. For papers with more than one author, most are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are the SCOAP3 consortium that sponsors open access publishing in Particle Physics, including one journal in the field of Astronomy and Astrophysics: *Physics Letters B*. Another example is the *Open Journal of Astrophysics*, an overlay journal that applies conventional review to papers submitted to arXiv. Depositing Astrophysics preprints to arXiv already started in the 1990's when arXiv was launched.

The analysis in this report is primarily based on Web of Science data. For Astronomy this has some limitations. This is because quite a number of small journals of small publishers are open access but unknown to WoS.

Using the LENS database, we found that 5% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

COMPUTER SCIENCE

Available options for open access publishing

In computer science there are 541 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 8% are full gold DOAJ-accepted journals (4% compliant with both copyright retention and license requirements), while 83% are hybrid (44% compliant with license requirements). Of the journals included in this analysis, 3% only offer green open access and 6% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 4% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *IEEE Access* (IEEE) and *Electronic Proceedings In Theoretical Computer Science* (Open Publishing Association). Few of the largest traditional publishers in this field have full gold open access journals. Examples of OA-only journal publishers are Frontiers (*Frontiers in Neurorobotics*) and PeerJ (*PeerJ Computer Science*). Many OA journals in computer science are organised from within the community, outside traditional publishers. Examples of more widely known diamond (zero APC-) journals are the *Journal of Open Source Software* (not in Web of Science), *Electronic Proceedings In Theoretical Computer Science* and *Logical Methods In Computer Science*.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Bioinformatics* (OUP, APC GBP 1943), *Journal Of Computational Physics* (Elsevier, USD 2800) and *Computer Graphics Forum* (Wiley, USD 3000).

Embargo lengths for green open access imposed in this field are typically 12 months, but a number of journals, mainly those of Emerald, allow self archiving in repositories with zero embargo.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 8% of all journals in this field, account for 9% of articles published. Another 85% of articles are published in hybrid journals, that in themselves make up 83% of all journals in this field. Within hybrid journals, of the 4440 articles published, 19% are gold open access. This is lower than the percentage observed for physical sciences &

technology as a whole (23%). Of the other, closed, papers in hybrid journals, 7% is available through green open access (self archiving in a repository), while 98% of hybrid journals in our sample allow green open access. While 35% of closed, subscription journals allow green open access, only 3% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a modest role in this field. An important society is the Association of Computing Machinery (ACM) with 3 (out of >50) journals that are fully open access, and the IEEE Computer Society with 23 journals in our sample, none of which are fully open access but new one has been created for this field in 2019.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 2 to 5. For papers with more than one author, many are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are: in Computer Science, conference proceedings are a very important publication venue, often not included in open access policies. Authors who publish articles in Springer's LNCS series or in the conference proceedings of ACM have the option of making individual articles openly accessible for a fee. Many OA journals in computer science are organised from within the community, outside traditional publishers. (source: Open-access.net)

The analysis in this report is primarily based on Web of Science data. For Computer Science, the limitation to articles/reviews could be expected to exclude conference proceedings. However, all conference proceedings in our sample are also labeled as articles and thus included. There still is an issue of WoS coverage of conference proceedings in itself, though - for instance, the series *Lecture Notes in Computer Science* is not included the Science Citation Index Expanded (SCIE), but instead in the Conference Proceedings Citation Index, which was not part of this study.

Using the LENS database, we found that 37.6% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.1% a CC-BY-ND license (using ASJC subject categories in LENS).

OPTICS

Available options for open access publishing

In optics there are 85 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 19% are full gold DOAJ-accepted journals (11% compliant with both copyright retention and license requirements), while 73% are hybrid (54% compliant with license requirements). Of the journals included in this analysis, 2% only offer green open access and 6% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 3% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Optics Express*, *Biomedical Optics Express* and *Optica* (all from The Optical Society). Only a few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Light: Science & Applications* (NPG); *High Power Laser Science and Engineering* (CUP), *IEEE Photonics Journal* (IEEE). Examples of OA-only journal publishers active in this field are MDPI and Hindawi. Examples of more widely known diamond (zero APC-) journals were not found.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. An example is *Optical Letters* with a list=price APC of USD 2480.

Embargo lengths for green open access imposed in this field are typically in the range of 12-24 months, e.g. *Optics Letters* and *Applied Optics* (The Optical Society, 12 months), *Journal of Luminescence* (Elsevier, 24 months for this and other optics journals).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 19% of all journals in this field, account for 25% of articles published. Another 73% of articles are published in hybrid journals, that in themselves make up 73% of all journals in this field. Within hybrid journals, of the 2120 articles published, 20% are gold open access. This is lower than the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 15% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 29% of closed, subscription journals allow green open

access, only 8% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are: The Optical Society (OSA) with 19 journals (including partnered journals), 7 of which are open access, International Society for Optics and Photonics (SPIE) has 11 journals, 3 of which are open access; the only journal from the European Optical Society is also open access.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 4 to 7. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Optics this has no specific limitations, other than the general bias of Web of Science against non-Western, non-English language, and recently launched journals.

Using the LENS database, we found that 43% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

GEOLOGY

Available options for open access publishing

In geology there are 212 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 22% are full gold DOAJ-accepted journals (12% compliant with both copyright retention and license requirements), while 68% are hybrid (52% compliant with license requirements). Of the journals included in this analysis, 3% only offer green open access and 7% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 1% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Biogeosciences*, *Hydrology and Earth System Sciences*, *Earth System Science* and *Journal of Glaciology*). Almost all of the largest traditional publishers in this field have a few full gold open access journals. A few examples of the publishers/titles are *Earth's Future* (AGU-Wiley), *Polar Research* (Taylor and Francis), *Earth, Planets and Space* (Springer), *Geosphere / Lithosphere* (GSA) and *Annals of Glaciology* (Cambridge University Press). Examples of OA-only journal publishers are Copernicus (specializing in earth sciences, with large numbers of journals) and Frontiers, MDPI and Hindawi (with each just a few relatively new journals in the field). A few examples of more widely known diamond (zero APC-) journals are the *Norwegian Journal of Geology* and *Earth System Science Data* that is not strictly diamond but waives APCs.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Geophysical Research Letters* (USD 2500), *Quaternary Science Reviews* (USD 3200), *Geology* (USD 2500) and the *Journal of Geophysical Research* (USD 3500).

Embargo lengths for green open access imposed in this field range from 6-12 months (AGU/Wiley) and 12 months (Springer) to 24 months (Elsevier).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 22% of all journals in this field, account for 26% of articles published. Another 71% of articles are published in hybrid journals, that in themselves make up 68% of all journals in this field. Within hybrid journals, of the 1935 articles published,

24% are gold open access. This is about equal to the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 14% is available through green open access (self archiving in a repository), while 97% of hybrid journals in our sample allow green open access. While 33% of closed, subscription journals allow green open access, only 14% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are EGU (18) and AGU (4).

In this field, publishing in non-English language journals is relatively common in some countries, e.g. in Japan and Russia, some Eastern European countries and the Spanish language area.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 4 to 8. For papers with more than one author, many are co-authored by researchers from multiple organizations.

Copernicus, that publishes journals of the European Geosciences Union, is the leading open access publisher in the field and as such on the forefront of developments towards open science.

The analysis in this report is primarily based on Web of Science data. For geology this has some limitations. This is because some journals are not covered (yet).

Using the LENS database, we found that 46% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

ENERGY & FUELS

Available options for open access publishing

In energy & fuels there are 96 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 15% are full gold DOAJ-accepted journals (11% compliant with both copyright retention and license requirements), while 79% are hybrid (63% compliant with license requirements). Of the journals included in this analysis, 1% only offer green open access and 5% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 1% had zero embargo explicitly mentioned in SHERPA/RoMEO.

This field consists of a natural science part (fundamental as well as applied/engineering) and a much smaller social science / policy part, each having its own journals, although there are also journals that cater for both parts.

Some well known fully open access journals are *Applied Energy*, *Energy Policy*, *Solar Energy* and *Renewable Energy*. Only a few of the largest traditional publishers in this field have sizable full gold open access journals. An example is *GCB Bioenergy* (Wiley). Examples of OA-only journal publishers are MDPI, Biomed Central, Frontiers and Hindawi, all with just 1 or 2 journals in the field. The full OA journal *Energies* from MDPI has grown to a size comparable with the largest journals in the field. There are very few widely known diamond (zero APC-) journals. The field is to a very large extent dominated by journals from Elsevier, with 34 of 96 journals and only 4 non-Elsevier journals among the 20 largest for cOAlition S fundees' articles. Elsevier journals have >60% of these articles published in the field.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Journal of Materials Chemistry* (RSC, GBP 1600), *Applied Energy* (Elsevier, USD 3650) and *Advanced Energy Materials* (Wiley, USD 5000).

Embargo lengths for green open access imposed in this field are typically in the range of 24 months (Elsevier) and 12 months (Wiley, Springer).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 15% of all journals in this field, account for 10% of articles published. Another 89% of articles are published in hybrid journals, that in themselves make up 79% of all journals in this field. Within hybrid journals, of the 2415 articles published, 23% are gold open access. This is equal to the percentage observed for physical sciences & technology as a whole (23%). Of the other, closed, papers in hybrid journals, 6% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 17% of closed, subscription journals allow green open access, only % of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a modest role in this field, mostly in chemistry approaches to energy and fuels. It is thus mainly the Royal Society of Chemistry (RSC) and the American Chemical Society (ACS) that play a role here, neither of which has fully open access journals in this particular field.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible. There are however also Russian and Iranian journals in the energy field. Please also note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 3 to 6. For papers with more than one author most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For this has some limitations for this field, mainly in lack of coverage of some non-English policy/economics oriented journals.

Using the LENS database, we found that 35% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

BIOCHEMISTRY & MOLECULAR BIOLOGY

Available options for open access publishing

In biochemistry & molecular biology there are 355 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 11% are full gold DOAJ-accepted journals (8% compliant with both copyright retention and license requirements), while 79% are hybrid (62% compliant with license requirements). Of the journals included in this analysis, 7% only offer green open access and 3% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, less than 1% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are Nucleic Acids Research, Molecules and the International Journal of Molecular Sciences. Most of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Molecular Systems Biology* (Wiley-Blackwell), *Cell Reports* (Cell Press), *Nature Communications* (NPG), *EBioMedicine* (Elsevier) and *Cells* (MDPI)

Examples of OA-only journal publishers are Public Library of Science (PLoS) and BioMed Central. Examples of diamond (zero APC-) journals are *Journal of Biomedical Science* (BioMed Central) and *Protein & Cell* (Springer).

Some of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are: *Bioinformatics* (OUP) 3150 USD - *Journal of Biological Chemistry* (American Society for Biochemistry and Molecular Biology) 1500 USD (members) or 2000 USD (non-members) - *Current Biology* (Cell Press, Elsevier) 5200 USD.

Embargo lengths for green open access imposed in this field are typically in the range of 12 months (American Society for Biochemistry and Molecular Biology and OUP).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 11% of all journals in this field, account for 19% of articles published. Another 78% of articles are published in hybrid journals, that in themselves

make up 79% of all journals in this field. Within hybrid journals, of the 6043 articles published, 39% are gold open access. This is higher than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 12% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 71% of closed, subscription journals allow green open access, only 17% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. Some open access journals are supported by multiple societies - *International Journal of Molecular Sciences and Molecules* (both MDPI). Some examples of societies with their number of full open access journals: Biochemical Society, with two out of seven journals fully open access. The American Society for Biochemistry and Molecular Biology, has no fully open access journals. The European counterpart FEBS (Federation of European Biochemical Societies) has two out of four journals open access.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 5 to 12. For papers with more than one author, most are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are - depositing in PubMed Central by the publisher - after 6 or 12 months; review articles and hypotheses being available for free immediately.

The analysis in this report is primarily based on Web of Science data. For Biochemistry & Molecular Biology this has some limitations. This is because the field is very broad and includes many subdisciplines.

Using the LENS database, we found that 39% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

ENVIRONMENTAL SCIENCES & ECOLOGY

Available options for open access publishing

In environmental sciences & ecology there are 432 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 11% are full gold DOAJ-accepted journals (6% compliant with both copyright retention and license requirements), while 82% are hybrid (58% compliant with license requirements). Of the journals included in this analysis, 3% only offer green open access and 4% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 5% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Sustainability* and *International Journal of Environmental Research and Public Health* (both MDPI), *Ecology and Evolution* (Wiley) and *Biogeosciences* (Copernicus). All the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Earth's Future* and *Ecology and Evolution* (both Wiley), *Polar Research* (Taylor & Francis) and *Conservation Physiology* (OUP). Examples of OA-only journal publishers are Copernicus (with e.g. *Biogeosciences*) and MDPI (with e.g. *Sustainability*). Examples of more widely known diamond (zero APC-) journals are *Journal of Political Ecology* and *Earth System Science Data* (which waves the APC but is not full blown diamond).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Science of the Total Environment* (USD 3400) and *Environmental Science and Pollution Research* (USD 3140).

Embargo lengths for green open access imposed in this field vary strongly by publisher (e.g. Springer 12 month, Sage 0 months). Where publishers have different embargo periods for different fields it is often 12-24 months for this field.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 11% of all journals in this field, account for 13% of articles published. Another 85% of articles are published in hybrid journals, that in themselves make up 82% of all journals in this field. Within hybrid journals, of the 6438 articles published,

27% are gold open access. This is lower than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 9% is available through green open access (self archiving in a repository), while 98% of hybrid journals in our sample allow green open access. While 42% of closed, subscription journals allow green open access, only 6% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role, especially in the chemistry and ecology approaches in this field. Quantitatively however overall the commercial traditional publishers dominate the field. A few societies with their number of full open access journals are the AGU, EGU (through Copernicus), RSC and ACS. These societies principally serve another or broader field than just this one (e.g. chemistry and geosciences).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is limited, perhaps except nationally focussed ecological and conservation journals. However, note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 4 to 6. For papers with more than one author, many are co-authored by researchers from multiple organizations.

This field is typically one where interdisciplinary research is becoming quite common (especially in sustainability, biodiversity and climate studies) and hence the field combines approaches from quite varied subdisciplines (biology, chemistry, earth sciences, social sciences), and with that also combining the publication cultures from those fields.

The analysis in this report is primarily based on Web of Science data. For Environmental Sciences & Ecology this has no specific limitations other than the general bias of Web of Science against non-Western, non-English language, and recently launched journals.
Using the LENS database, we found that 46% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

NEUROSCIENCES & NEUROLOGY

Available options for open access publishing

In neurosciences neurology there are 375 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 16% are full gold DOAJ-accepted journals (11% compliant with both copyright retention and license requirements), while 77% are hybrid (53% compliant with license requirements). Of the journals included in this analysis, 5% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 9% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are: *Alzheimer's Research and Therapy* and also *Journal of Neuroinflammation* (both BioMed Central) and *Neurology: Neuroimmunology and Neuroinflammation* (Lippincott, Williams and Wilkins)

Only a few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *NeuroImage:Clinical* (Elsevier), *Social Cognitive and Affective Neuroscience* (Oxford UP), *Brain Sciences* (MDPI) or *Brain and Behavior* (Wiley). Examples of OA-only journal publishers are BioMed Central and Frontiers. There is a lesser known example of a diamond (zero APC-) journal:*Folia Neuropathologica*.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are: *eNeuro* 2925 USD, *NeuroImage*, 2600 USD and *International Journal of Alzheimer's Disease* 750 USD.

Embargo lengths for green open access imposed in this field are typically in the range of 6 -12 months *;* e.g*. Nature Neuroscience* 6 months and *Neuron* and *Trends in Neuroscience*: 12 months

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 16% of all journals in this field, account for 18% of articles published. Another 81% of articles are published in hybrid journals, that in themselves

make up 77% of all journals in this field. Within hybrid journals, of the 4939 articles published, 34% are gold open access. This is about equal to the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 15% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 69% of closed, subscription journals allow green open access, only 18% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are: American Academy of Neurology with two Open access journals: *Neurology: Genetics* and *Neurology: Neuroimmunology and Inflammation;*
American Neurological Association: *Annals of Clinical and Translational Neurology.*

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 5 to 11. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Neurosciences & Neurology it should be noted that journals with a more clinical focus are also present in the list of journals.

Using the LENS database, we found that 46% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

CELL BIOLOGY

Available options for open access publishing

In cell biology there are 204 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 17% are full gold DOAJ-accepted journals (12% compliant with both copyright retention and license requirements), while 70% are hybrid (57% compliant with license requirements). Of the journals included in this analysis, 10% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 4% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Cell Reports*, *Stem Cell Reports* and *Journal of Extracellular Vesicles*. *Oncotarget*, although not listed on the DOAJ, is a well known CC-BY open access journal (Note: *Oncotarget* is no longer indexed by WoS en Medline from 2018 onwards).

Only a few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Cell Death and Disease* (Nature Publishing Group), *Aging Cell* (Wiley) or *Cellular Physiology and Biochemistry* (Karger). Examples of OA-only journal publishers are BioMed Central and Hindawi. An example of a more widely known diamond (zero APC-) journal is *Protein & Cell* (Springer).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Cell* 5200 USD, *EMBO Journal* (5200 USD), *Current Opinion in Cell Biology* (4400USD) and *Journal of Cell Science* (2500 GBP).

Embargo lengths for green open access imposed in this field are typically in the range of 6 - 12 months. Journals from Cell Press: 12 months; most Elsevier Journals 6 months.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 17% of all journals in this field, account for 19% of articles published. Another 75% of articles are published in hybrid journals, that in themselves make up 70% of all journals in this field. Within hybrid journals, of the 3126 articles published,

47% are gold open access. This is higher than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 18% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 81% of closed, subscription journals allow green open access, only 30% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play only a modest role in this field. The American Society for Cell Biology has only one hybrid journal, as is the case with the only journal from the Society for Histochemistry.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 5 to 23. For papers with more than one author, many are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Cell Biology this has some limitations. The field leans somewhat against clinical subjects such as cytotherapy and cytopathology etc. These titles are sometimes included, sometimes not.

Using the LENS database, we found that 32% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

PHARMACOLOGY & PHARMACY

Available options for open access publishing

In pharmacology & pharmacy there are 263 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 14% are full gold DOAJ-accepted journals (6% compliant with both copyright retention and license requirements), while 77% are hybrid (49% compliant with license requirements). Of the journals included in this analysis, 6% only offer green open access and 3% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 4% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Antibiotics* (MDPI) and *Journal of Pharmaceutical Analysis* (Elsevier).

Only a few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are International Journal of *Neuropsychopharmacology* (Oxford), *Journal of Enzyme Inhibition and Medicinal Chemistry* (Taylor and Francis) or *Pharmacology Research and Perspectives* (Wiley-Blackwell).

Examples of OA-only journal publishers are Frontiers Media, MDPI and DOVE Medical Press. Examples of diamond (zero APC-) journals are the *Journal of Pharmaceutical Analysis* and *Acta Pharmaceutica Sinica B* (both from Elsevier). However, these journals currently contain few articles from cOAlition S/EC/ERC-funded researchers.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Antimicrobial Agents and Chemotherapy* (Am. Soc. for Microbiology) 2400 USD (members) 3300 USD (non-members).

Embargo lengths for green open access imposed in this field is typically in the range of 12 months *(e.g.* Elsevier, OUP*).*

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 14% of all journals in this field, account for 10% of articles published. Another 87% of articles are published in hybrid journals, that in themselves make up 77% of all journals in this field. Within hybrid journals, of the 2702 articles published, 27% are gold open access. This is lower than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 11% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 68% of closed, subscription journals allow green open access, only 4% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a modest role in this field. No societies with well known full open access journals can be found so far.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 6 to 12. For papers with more than one author most are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are: Patents and funder requirements can be a barrier to open access publishing in this field (especially for drug development)

The analysis in this report is primarily based on Web of Science data. For Pharmacology & Pharmacy this has no specific limitations other than the general bias of Web of Science against non-Western, non-English language, and recently launched journals.

Using the LENS database, we found that 32% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

IMMUNOLOGY

Available options for open access publishing

In immunology there are 147 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 18% are full gold DOAJ-accepted journals (12% compliant with both copyright retention and license requirements), while 73% are hybrid (53% compliant with license requirements). Of the journals included in this analysis, 5% only offer green open access and 3% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 4% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Frontiers in Immunology*, *Frontiers in Cellular and Infection Microbiology*, *Emerging Infectious Diseases*.
Few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Vaccines* (MDPI) or *Journal of Inflammation Research* (Dove Medical Press). Examples of OA-only journal publishers are BioMed Central and Frontiers Media. An example of a more widely known diamond (zero APC-) journal is: *Allergology Internationa*l (Elsevier).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are: *Emerging Microbes and Infections*: 1850 GBP or *Frontiers in Immunology*: 2950 USD.

Embargo lengths for green open access imposed in this field are typically in the range of 6-12 months (examples: *Nature Reviews in Immunology* resp. *Immunity* or *Trends in Immunology*).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 18% of all journals in this field, account for 24% of articles published. Another 73% of articles are published in hybrid journals, that in themselves make up 73% of all journals in this field. Within hybrid journals, of the 2151 articles published, 45% are gold open access. This is higher than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 19% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our

sample allow green open access. While 67% of closed, subscription journals allow green open access, only 25% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a very important role in this field. Hardly any society has full open access journals: *Clinical Translational Allergy* from the European Academy of Allergy and Clinical Immunology (EAACI) is one. Two main overarching Federations of societies FOCIS (US based) and EFIS (European) do not mention open access on their websites.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 7 to 11. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Immunology as a field this has some limitations. This is because the field is intertwined with the field of Microbiology.

Using the LENS database, we found that 46% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

PUBLIC ENVIRONMENTAL & OCCUPATIONAL HEALTH

Available options for open access publishing

In public environmental & occupational health there are 246 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 24% are full gold DOAJ-accepted journals (11% compliant with both copyright retention and license requirements), while 68% are hybrid (44% compliant with license requirements). Of the journals included in this analysis, 6% only offer green open access and 3% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 13% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are: *BMC Public Health*, *Environmental Health Perspectives*, *Lancet Global Health*. Only a few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Global Health Action* (Taylor & Francis) and *Health Expectations* (Wiley). Examples of OA-only journal publishers are Biomed Central and MDPI. Examples of more widely known diamond (zero APC-) journals are: *Global Health Research and Policy* (BioMedCentral; not in WoS but indexed in PubMed), *Journal of Public Health Research.*

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are: *Journal of Clinical Epidemiology* (Elsevier, 3200 USD), *American Journal of Epidemiology* (Oxford 2363 GBP).

Embargo lengths for green open access imposed in this field are typically in the range of 0 - 12 months. Articles published in J*ournal of Epidemiology and Community Health* (BMJ), or *Journal of Occupational Health Psychology* (APA) can be archived without embargo, while there is an embargo of twelve months for *American Journal for Tropical Hygiene* (American Society of Tropical Medicine & Hygiene) and *Statistics in Medicine* (Wiley).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 24% of all journals in this field, account for 31% of articles published. Another 67% of articles are published in hybrid journals, that in themselves

make up 68% of all journals in this field. Within hybrid journals, of the 1954 articles published, 39% are gold open access. This is higher than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 14% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 67% of closed, subscription journals allow green open access, only 38% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies seem to play only a little role in this field, but there is a role for governmental and intergovernmental organizations in publishing: A few organizations with their number of full open access journals are: CDC: Centres for Disease Control and Prevention (3 journals; all open access) and World Health Organization with some of the 9 publications freely available.

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 3 to 15. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Public Environmental & Occupational Health this has strong limitations. This is because the boundaries of the field are hard to define. In some databases (compared to WoS) more journals in the subfield health statistics, health prevention, health economics are included. On the other hand, in WoS some important journals like for instance “PLoS Neglected Tropical Diseases” or “Eurosurveillance” are not included in this field.

Some journals in the subfield of health prevention tend to be as open as possible (diamond), for the sake of global health safety (e.g. ebola, HIV, tobacco control, obesity).

Using the LENS database, we found that 46% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

MICROBIOLOGY

Available options for open access publishing

In microbiology there are 126 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 22% are full gold DOAJ-accepted journals (15% compliant with both copyright retention and license requirements), while 67% are hybrid (57% compliant with license requirements). Of the journals included in this analysis, 8% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, none had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *PLOS Pathogens*, *Frontiers in Microbiology* and *MBIO*. Only a few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Microbial Biotechnology* (Wiley) and *Open Forum Infectious Diseases* (Oxford). Examples of OA-only journal publishers are Biomed Central, Frontiers Media and PLoS. No examples of more widely known diamond (zero APC-) journals can be found.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Journal of Infectious Diseases* as well as *Clinical Infectious Diseases* (both from Oxford UP, 2412 GBP for CC-BY), *Antimicrobial Agents and Chemotherapy*: 3300 USD for non-members (members: 2400 USD)

Embargo lengths for green open access imposed in this field are typically in the range of 12-24 months (e.g. Oxford UP), 12 months (e.g. Wiley).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 22% of all journals in this field, account for 33% of articles published. Another 66% of articles are published in hybrid journals, that in themselves make up 67% of all journals in this field. Within hybrid journals, of the 1822 articles published, 48% are gold open access. This is higher than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 21% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our

sample allow green open access. While 77% of closed, subscription journals allow green open access, only 6% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals are American Society for Microbiology (four out of 16 journals are open access), Microbiology Society (two out of 7 are gold open access; *JMM Case Reports* ceased, but a new gold journal appeared: *Access Microbiology* for the publication of replication studies, negative or null results, data management plans etc.). Another important society is FEMS (Federation of European Microbiological Societies): the 5 journals are hybrid).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 6 to 12. For papers with more than one author, most are co-authored by researchers from multiple organizations.

Using the LENS database, we found that 53% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

GENETICS & HEREDITY

Available options for open access publishing

In genetics & heredity there are 172 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 22% are full gold DOAJ-accepted journals (16% compliant with both copyright retention and license requirements), while 70% are hybrid (55% compliant with license requirements). Of the journals included in this analysis, 6% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 4% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *PLoS Genetics* (Public Library of Science) and *BMC Genomics* (BioMed Central). Some of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Genome Biology and Evolution* (Oxford University Press) and *G3: Genes Genomes Genetics* (The Genetics Society of America). Examples of OA-only journal publishers are BioMed Central (BMC) and the Public Library of Science (PLoS). There are no widely known diamond (zero APC-) journals.

Most of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Genetics* (Genetics Society America, $2000), *Molecular Biology and Evolution* (Oxford University Press, $2500/€1875/£1450), *Genome Research* (Cold Spring Harbor Laboratory Press, $2500). A main journal in the field, *Nature Genetics* (Nature Publishing Group), does not have a paid Open Access option but makes reference genome papers Open Access at their discretion, without additional cost to authors.

Embargo lengths for green open access imposed in this field are typically in the range of 6-12 months (e.g. 12 months for Wiley and Springer journals, 6 months for Cell Press (Elsevier), Nature Publishing Group and Lippincott Williams and Wilkins).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 22% of all journals in this field, account for 33% of articles published. Another 65% of articles are published in hybrid journals, that in themselves make up 70% of all journals in this field. Within hybrid journals, of the 1795 articles published,

46% are gold open access. This is higher than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 21% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 79% of closed, subscription journals allow green open access, only 33% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a modest role in this field. A few societies with their number of full open access journals are the Genetics Society of America (1 full OA journal) and The Genetics Society (no full OA journals).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 5 to 33. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Genetics and Heredity this has no specific limitations other than the general bias of Web of Science against non-Western and non-English language journals, and against recently launched journals in general.

Using the LENS database, we found that 53% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

ONCOLOGY

Available options for open access publishing

In oncology there are 198 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 19% are full gold DOAJ-accepted journals (11% compliant with both copyright retention and license requirements), while 71% are hybrid (48% compliant with license requirements). Of the journals included in this analysis, 9% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 3% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *BMC Cancer*, *Cancer Medicine* and *Molecular Cancer*. Oncotarget, although not listed on the DOAJ, is also a well known CC-BY open access journal. (Note: *Oncotarget* is no longer indexed by WoS en Medline from 2018 onwards)

A few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers/titles are *Molecular Oncology* (Wiley), *Cancers* (MDPI), *Therapeutic Advances in Medical Oncology* (Sage) or *Neoplasia: an International Journal for Oncology Research* (Elsevier). A few examples of OA-only journal publishers are *BiomedCentral*, *PLOS* and *Hindawi*. An example of a more widely known diamond (zero APC-) journal is *Applied Cancer Research* (BiomedCentral).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Breast Cancer* (Nature Publishing Group: 2800 USD), *Journal of Oncology* (Hindawi: 800 USD); *Journal of Cancer Research and Therapeutics* (Wolters Kluwer: 1500 USD)

Embargo lengths for green open access imposed in this field are typically in the range of 6 months as is the case for the journals from ASCO (American Society for Clinical Oncology)

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 19% of all journals in this field, account for 14% of articles published. Another 83% of articles are published in hybrid journals, that in themselves

make up 71% of all journals in this field. Within hybrid journals, of the 1852 articles published, 53% are gold open access. This is higher than the percentage observed for life sciences & medicine as a whole (35%). Of the other, closed, papers in hybrid journals, 15% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 85% of closed, subscription journals allow green open access, only 37% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. Two societies with their number of full open access journals are ASCO (American Society of Clinical Oncology: 5 journals, one of them is an open access-journal (*Journal of Global Oncology*)) and ESMO (European Society for Medical Oncology: 3 journals, one of them is an open access-journal (*ESMO-Open*)).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible (but note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS).

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 6 to 14. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Oncology this has no limitations; almost all journals in the field are represented.

Using the LENS database, we found that 35% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

PSYCHOLOGY

Available options for open access publishing

In psychology there are 442 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 5% are full gold DOAJ-accepted journals (3% compliant with both copyright retention and license requirements), while 89% are hybrid (50% compliant with license requirements). Of the journals included in this analysis, 3% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 24% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Frontiers in Psychology* and *Frontiers in Human Neuroscience*. Most of the largest traditional publishers in this field some full gold open access journals. A few examples of the publishers/titles are Elsevier (*Developmental Cognitive Neuroscience*), Sage (*I Perception*) and Taylor & Francis (*European Journal of Psychotraumatology*). Frontiers is the single OA-only journal publisher with multiple publications. Examples of more widely known diamond (zero APC-) journals are not available, although some smaller diamond journals are included in Web of Science.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Neuropsychologia* (USD 2600), *Journal of Child Psychology and Psychiatry* (USD 3800) and *Cognition* (USD 2450).

Embargo lengths for green open access imposed in this field are typically in the range of 6-18 months.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 5% of all journals in this field, account for 14% of articles published. Another 83% of articles are published in hybrid journals, that in themselves make up 89% of all journals in this field. Within hybrid journals, of the 2640 articles published, 28% are gold open access. This is higher than the percentage observed for social sciences as a whole (24%). Of the other, closed, papers in hybrid journals, 13% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 60% of closed, subscription journals allow green open access, only

9% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a modest role in this field in the sense that among the most used journals only a minority is owned by a society. The larger societies do have substantial numbers of journals though. Both the larger societies (American Psychological Association: one full OA journal and more than 80 hybrid journals, British Psychological Society: 11 hybrid journals) and smaller ones (Association for Child and Adolescent Mental Health, the Association for Psychological Science) offer hybrid open access for their journals.

In this field, publishing in non-English language scholarly journals by current cOAlition-S funded researchers is negligible. Note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 3 to 7. For papers with more than one author, most are co-authored by researchers from multiple organizations.

Another development in this field that is relevant for open access uptake is the launch of PsyArXiv in December 2016, already containing more than 4000 preprints. This is an example of a broader focus on openness in psychology, following the replication crisis. That increased openness is also promoted by the Society for the Improvement of Psychological Science (SIPS).

The analysis in this report is primarily based on Web of Science data. For Psychology this has some limitations. Journals aimed at professionals (for instance the Dutch journal *Kind en Adolescent*) are important for the dissemination of scientific knowledge, but are not indexed in Web of Science.

Using the LENS database, we found that 35% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

BUSINESS & ECONOMICS

Available options for open access publishing

In business & economics there are 626 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 8% are full gold DOAJ-accepted journals (3% compliant with both copyright retention and license requirements), while 80% are hybrid (40% compliant with license requirements). Of the journals included in this analysis, 7% only offer green open access and 5% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 17% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Theoretical Economics* (from the Econometric Society) and *Quantitative Economics*. Only a few of the largest traditional publishers in this field have full gold open access journals that cOAlition-funded researchers regularly publish in. A few examples of the publishers/titles are *Health Economics Review* (Springer) and, again, *Quantitative Economics* (Wiley). Examples of OA-only journal publishers are BiomedCentral (but only for health economics) and MDPI (though with just a few titles that are not (yet) frequently used compared to traditional journals). An example of more widely known diamond (zero APC-) journal is *Economics* (associated with the Kiel Institute for World Economics and the Leibniz Information Centre for Economics).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Technological Forecasting and Social Change* (Elsevier, USD 1300), *Regional Studies* (Taylor & Francis, €2395 and *Social Choice and Welfare S* (Springer, €2040).

Embargo lengths for green open access imposed in this field are typically in the range of 24 months, except where publishers have generic embargo lengths (e.g. Springer 12 months and Sage 0 months).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 8% of all journals in this field, account for 6% of articles published. Another 87% of articles are published in hybrid journals, that in themselves make up 80% of all journals in this field. Within hybrid journals, of the 2268 articles published,

21% are gold open access. This is lower than the percentage observed for social sciences as a whole (24%). Of the other, closed, papers in hybrid journals, 8% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 58% of closed, subscription journals allow green open access, only 9% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field, though often their journals are published for them by a commercial publisher. A few societies with their number of full open access journals are Econometric Society (3 journals) and the Regional Studies Association (5 journals).

In this field, publishing in non-English language journals is limited though many e.g. Spanish and Russian journals exist, albeit with very few publications funded by current cOAlition S funders. However, note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 2 to 3. For papers with more than one author, many are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For business and economics this has some limitations. This is because smaller and non-English journals are often not indexed yet by WoS, e.g. some from Central and Eastern Europe.

Using the LENS database, we found that 21% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

GOVERNMENT & LAW

Available options for open access publishing

In government & law there are 258 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 4% are full gold DOAJ-accepted journals (2% compliant with both copyright retention and license requirements), while 81% are hybrid (35% compliant with license requirements). Of the journals included in this analysis, 9% only offer green open access and 6% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 11% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Full OA journals in the field that cOAlition S funded authors regularly publish in are quite rare. Very few of the largest traditional publishers in this field have full gold open access journals. More widely known diamond (zero APC-) journals that this group publishes in are also quite rare in this field, though many diamond journal with a less international focus do exist.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Journal of European Public Policy* (Taylor & Francis, €2840), *Electoral Studies* (Elsevier, USD 1950) and *Journal of Peace Research* (Sage, USD 3000).

Embargo lengths for green open access imposed in this field are typically in the range of 24 months, except where publishers have decided on a generic embargo length (e.g. 12 months for Springer and 0 months for Sage).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 4% of all journals in this field, account for 3% of articles published. Another 90% of articles are published in hybrid journals, that in themselves make up 81% of all journals in this field. Within hybrid journals, of the 700 articles published, 19% are gold open access. This is lower than the percentage observed for social sciences as a whole (24%). Of the other, closed, papers in hybrid journals, 11% is available through green open access (self archiving in a repository), while 98% of hybrid journals in our sample allow green open access. While 59% of closed, subscription journals allow green open access, only

4% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

In this field, publishing in non-English language journals is common in many countries, especially in law rather than political science.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper is 2. For papers with more than one author, quite some are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Government and law this has strong limitations. This is because the field as defined by WoS is very heterogeneous and also excludes many law journals.

Using the LENS database, we found that 20% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

EDUCATION & EDUCATIONAL RESEARCH

Available options for open access publishing

In education & educational research there are 275 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 12% are full gold DOAJ-accepted journals (5% compliant with both copyright retention and license requirements), while 78% are hybrid (33% compliant with license requirements). Of the journals included in this analysis, 5% only offer green open access and 5% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 16% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some fully open access journals are International *Journal of Serious Games*, *Education Sciences* and *International Review of Research in Open and Distributed Learning*. Most of the largest traditional publishers in this field have (a few) full gold open access journals. A few examples of the publishers/titles are Springer with *International Journal of Childcare and Education Policy*, *The International Journal of Educational Technology in Higher Education and* Taylor & Francis with *Higher Education Pedagogies*, *Journal of Statistics Education, Cogent Education*. Examples of OA-only journal publishers are Hindawi, Biomed Central, MDPI and Frontiers. An example of a diamond (zero APC-) journal in this field is the International Review of Research In Open and Distributed Learning (Athabasca University).

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *British Educational Research Journal* (Wiley, USD 3000); *Computers & Education* (Elsevier, USD 2100); *Higher Education* (Springer, USD 2690); *Teaching and Teacher Education* (Elsevier, USD 1200); *European Educational Research Journal* (Sage, USD 3000).

Embargo lengths for green open access imposed in this field are typically in the range of 12 - 24 months (Sage 0 months and Springer 12 months, Taylor & Francis 12-18 months, Wiley 12 (psychology) to 24 (social sciences) months, Elsevier 24 months).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 12% of all journals in this field, account for 10% of articles published. Another 84% of articles are published in hybrid journals, that in themselves make up 78% of all journals in this field. Within hybrid journals, of the 568 articles published, 20% are gold open access. This is lower than the percentage observed for social sciences as a whole (24%). Of the other, closed, papers in hybrid journals, 7% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 50% of closed, subscription journals allow green open access, only 2% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a very modest role in this field. A few societies with their number of full open access journals are The Serious Games Society (1 journal) and The Association for Learning Technology (1).

In this field, publishing in non-English language journals is expected in many countries, such as the Dutch journals *Kind en Adolescent, Tijdschrift voor Orthopedagogiek, Pedagogische Studiën* and *Pedagogiek* or the German journals *Bildung und Erziehung, Unterrichtswissenschaft* (published by Springer), *Psychologie in Erziehung und Unterricht* and *Geschichte in Wissenschaft und Unterricht*. Similar cases will be present in the French and Spanish language areas.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 1 to 4. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Education & Educational Research this has some limitations. This is because (scientific) journals aimed at professionals (for instance the Dutch journals *Kind en adolescent* and *Orthopedagogiek: onderzoek en praktijk*, but there will be others in other language areas) are important for the dissemination of scientific knowledge, but are not indexed in Web of Science. The background of this is that educational systems vary in all countries. This is reflected in the importance of more local journals.

Using the LENS database, we found that 31% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

GEOGRAPHY

Available options for open access publishing

In geography there are 97 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 19% are full gold DOAJ-accepted journals (3% compliant with both copyright retention and license requirements), while 76% are hybrid (54% compliant with license requirements). Of the journals included in this analysis, 3% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 11% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Regional Studies Regional Science*, *Fennia* and *Cybergeo* (and outside this WoS selection also journals like *ISPRS Journal of Geoinformation*, *Geographica Helvetica*, *Belgeo* and *Die Erde*). Only a few of the largest traditional publishers in this field have full gold open access journals. A few examples of the publishers and their titles are Taylor & Francis (*Journal of Maps* and Regional Studies, Regional Science). Examples of OA-only journal publishers are not present in the WoS sample. Examples of more widely known diamond (zero APC-) journals are again (outside this sample) *Geographica Helvetica*, *Belgeo*, *Cybergeo* and *Fennia*, as well as many Eastern European journals, e.g. *Quaestiones Geographicae*.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Geoforum* (€2100), *Environment and Planning A* (€3000) and *Gender, Place and Culture* (€2950).

Embargo lengths for green open access imposed in this field are typically 12 months (Springer, Taylor & Francis) or 24 months (Wiley, Elsevier) or 0 months (Sage).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 19% of all journals in this field, account for 7% of articles published. Another 91% of articles are published in hybrid journals, that in themselves make up 76% of all journals in this field. Within hybrid journals, of the 612 articles published, 26% are gold open access. This is about equal to the percentage observed for social sciences

as a whole (24%). Of the other, closed, papers in hybrid journals, 10% is available through green open access (self archiving in a repository), while 97% of hybrid journals in our sample allow green open access. While 60% of closed, subscription journals allow green open access, only 14% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a modest role in this field. A few societies with their number of full open access journals are The American Association of Geographers (0) and The Institute of British Geographers (0). Most full OA journals are published by universities, especially in Latin America and Eastern Europe.

In this field, publishing in non-English language journals is quite common in Latin America and France, but otherwise English is dominant.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 2 to 4. For papers with more than one author quite some are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are the increasing interdisciplinarity of e.g. economic geography with regional economics, of other parts of human geography with sociology and of many geographical studies generally with all kinds of sustainability sciences, implying a broader range of applicable journals.

The analysis in this report is primarily based on Web of Science data. Though most important English language geography journals are included, Web of Science still has relatively strong coverage limitations outside the Anglosaxon and North- and West-European countries. This is because articles from those countries are often published in journals not covered by Web of Science. Also newer, smaller and open access journals in the field seem underrepresented in WoS.

Using the LENS database, we found that 53% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

LINGUISTICS

Available options for open access publishing

In linguistics there are 159 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 11% are full gold DOAJ-accepted journals (5% compliant with both copyright retention and license requirements), while 83% are hybrid (28% compliant with license requirements). Of the journals included in this analysis, 3% only offer green open access and 3% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 5% had zero embargo explicitly mentioned in SHERPA/RoMEO.

Some well known fully open access journals are *Glossa, a journal of general linguistics* & *Open Linguistics*. Almost none of the largest traditional publishers in this field have full gold open access journals. Two examples of such publishers are MIT Press (*Computational Linguistics*) and De Gruyter (*Open Linguistics*). Examples of OA-only journal publishers are Ubiquity Press, Open Library of Humanities. An example of a more widely known diamond (zero APC-) journals is *Computational Linguistics* (MIT Press).

Hardly any of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples from WoS with their list-price APC are *The Journal of Speech Language and Hearing Research* (APC: 2000 dollar) and *The Journal of Memory and Language* (APC: 2100 dollar)

Embargo lengths for green open access imposed in this field are typically in the range of 6 - 24 months. A few examples are Oxford: 18 - 24 months, for the arts & humanities mostly 24 months (longer than other disciplines), Cambridge: 6 months, Taylor & Francis: 18 months. SHERPA/RoMEO is not very well suited for finding out the embargo periods of non-Anglo-Saxon journals.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 11% of all journals in this field, account for 12% of articles published. Another 85% of articles are published in hybrid journals, that in themselves make up 83% of all journals in this field. Within hybrid journals, of the 414 articles published, 20% are gold open access. This is lower than the percentage observed for social sciences as a

whole (24%). Of the other, closed, papers in hybrid journals, 7% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 50% of closed, subscription journals allow green open access, only % of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies with their number of full open access journals in WoS are Linguistic Society of America (2 journals, one gold, one green) & SEPLN (1 closed journal).

In this field, publishing in non-English language journals is common in almost any country.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 2 to 6. For papers with more than one author, relatively few are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are the efforts of the Open Library of Humanities to ‘flip’ existing closed journals from traditional publishers to gold open access journals. An example for this is *Glossa* (Ubiquity Press) that was formerly *Lingua* (Elsevier).

The analysis in this report is primarily based on Web of Science data. For Linguistics this has quite strong limitations. This is because many journals in the field of linguistics are not covered by WoS. If the WoS sample diverges from what is not covered, that could limit the value of conclusions drawn here for the field as a whole.

Using the LENS database, we found that 39.7% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and none a CC-BY-ND license (using ASJC subject categories in LENS).

PUBLIC ADMINISTRATION

Available options for open access publishing

In public administration there are 85 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 1% are full gold DOAJ-accepted journals (none compliant with both copyright retention and license requirements), while 95% are hybrid (55% compliant with license requirements). Of the journals included in this analysis, 1% only offer green open access and 2% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 17% had zero embargo explicitly mentioned in SHERPA/RoMEO.

There are virtually no fully open access journals in this field, probably partially caused by the fact that many journals are related to societies.

Most of the journals in this analysis are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. Examples are Public Administration Review (Wiley, €2900) and Journal of European Public Policy (Taylor & Francis, €2840)

Embargo lengths for green open access imposed in this field are typically in the range of 6-24 months, with Sage notably having a generic 0 months embargo policy.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 1% of all journals in this field, account for % of articles published. Another 99% of articles are published in hybrid journals, that in themselves make up 95% of all journals in this field. Within hybrid journals, of the 531 articles published, 22% are gold open access. This is about equal to the percentage observed for social sciences as a whole (24%). Of the other, closed, papers in hybrid journals, 10% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 33% of closed, subscription journals allow green open access, only % of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field. A few societies are ASPA (American Society for Public Administration), the Public Management Research Association, the European Group of Public Administration, the International Research Society of Public Management, APSA (American Political Science Association), the Association for Public Policy and Management and the ECPR (European Consortium for Political Research).

In this field, publishing in non-English language journals is negligible but there are some journals published in French or Dutch (for example *Tijdschrift voor Bestuurskunde*). However, note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 2 to 4. For papers with more than one author most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Public Administration this has little limitations. The majority of relevant journals is represented in the database.

Using the LENS database, we found that 35% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0% a CC-BY-ND license (using ASJC subject categories in LENS).

SOCIOLOGY

Available options for open access publishing

In sociology there are 105 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 3% are full gold DOAJ-accepted journals (3% compliant with both copyright retention and license requirements), while 81% are hybrid (33% compliant with license requirements). Of the journals included in this analysis, 10% only offer green open access and 7% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 33% had zero embargo explicitly mentioned in SHERPA/RoMEO.

There are very few fully open access journals in this field in WoS, only 3 in the list of 100 journals: *Societies* (MDPI); *Secularism & Nonreligion* (Ubiquity Press) and *Società Mutamento Politica* (University of Firenze Press). Only some of the largest traditional publishers in this field have full gold open access journals (for example the Taylor & Francis journals *Policy and Society*, *Society*, *Health & Vulnerability,* which are both not classified as Sociology journals in WoS. Examples of OA-only journal publishers are MDPI and Ubiquity Press. Examples of diamond (zero APC-) journals are the aforementioned *Società Mutamento Politica,* as well as *Journal of Artificial Societies and Social Simulation* (University of Surrey) and *Surveillance & Society* (Surveillance Studies Network). The latter two are included in Web of Science, but not classified as Sociology journals.

Many of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Sociology of Health & Illness* (Wiley, USD 3200), *Ethnic and Racial Studies* (T&F, USD 2950) *Social Indicators Research* (Springer, USD 2690), *Sociological Review* (Sage USD 3000), *European Sociological Review* (Oxford, USD 3646).

Embargo lengths for green open access imposed in this field are in the range of 0-24 months (Sage 0 months, Springer 12 months, Taylor & Francis 18 months, Wiley and Oxford 24 months).

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 3% of all journals in this field, account for 1% of articles published. Another 90% of articles are published in hybrid journals, that in themselves make up 81% of all journals in this field. Within hybrid journals, of the 415 articles published, 25% are gold open access. This is about equal to the percentage observed for social sciences as a whole (24%). Of the other, closed, papers in hybrid journals, 12% is available through green open access (self archiving in a repository), while 100% of hybrid journals in our sample allow green open access. While 59% of closed, subscription journals allow green open access, only 12% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a modest role in this field. The American Sociological Association has 14 journals (published by Sage), of which 1 is full open access (*Socius: Sociological Research for a Dynamic World*, not (yet) in WoS). Some international societies with their number of full open access journals are Polish Sociological Association (1 journal), Czech sociological community (1 journal).

In this field, publishing in non-English language journals by current cOAlition-S funded researchers is negligible, although journals in other languages do exist. However, please note that our analysis may underestimate the importance of non-English publishing languages, because of limited and biased coverage of WoS.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 1 to 3. For papers with more than one author, most are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For sociology, this does have limitations, mainly because the long tail of thousands of sociology journals is either not covered in Web of Science at all or is not classified as sociology in the subject classification in Web of Science.

Using the LENS database, we found that 26.3% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.9% a CC-BY-ND license (using ASJC subject categories in LENS).

PHILOSOPHY

Available options for open access publishing

In philosophy there are 91 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 5% are full gold DOAJ-accepted journals (1% compliant with both copyright retention and license requirements), while 73% are hybrid (35% compliant with license requirements). Of the journals included in this analysis, 11% only offer green open access and 11% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 6% had zero embargo explicitly mentioned in SHERPA/RoMEO.

There are no well known fully open access journals in the list of WoS. None of the largest traditional publishers in this field have full gold open access journals. Examples of OA-only journal publishers are the Institute of Philosophy of the Jagiellonian University & Rosenberg and Sellier. Examples of more widely known diamond (zero APC-) journals are not available in WoS, an example of lesser known diamond journal are *Diametros* and *Rivista di Estetica*.

Almost none of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples with their list-price APC are *Synthese* (APC: 2.040 euro), *Journal of Applied Philosophy* (APC: 2.150 euro) and *Philosophy, Social Criticism* (APC: 3.000 dollar).

Embargo lengths for green open access imposed in this field are typically in the range of 0-24 months. For example: Sage (0 months) & Springer (12 months)

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes.

Full gold open access journals, that make up 5% of all journals in this field, account for 4% of articles published. Another 83% of articles are published in hybrid journals, that in themselves make up 73% of all journals in this field. Within hybrid journals, of the 204 articles published, 35% are gold open access. This is higher than the percentage observed for arts & humanities as a whole (27%). Of the other, closed, papers in hybrid journals, 5% is available through green open access (self archiving in a repository), while 94% of hybrid journals in our sample allow green open access. While 50% of closed, subscription journals allow green open access, only

12% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play an important role in this field, but in our data there are no societies that manage their own publications.

In this field, publishing in non-English language journals is common in many countries like Brazil, Italy, Switzerland, Germany and France.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 1 to 3. For papers with more than one author, few are co-authored by researchers from multiple organizations.

The analysis in this report is primarily based on Web of Science data. For Philosophy this has strong limitations. This is because most of the philosophical journals do not occur in the data of WoS. Therefore, the data given here is not indicative of the actual situation.

Using the LENS database, we found that 24.5% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 2.1% a CC-BY-ND license (using ASJC subject categories in LENS).

HISTORY

Available options for open access publishing

In history there are 108 journals listed in Web of Science that cOAlitionS-funded authors published in in 2017. Of those, 4% are full gold DOAJ-accepted journals (none compliant with both copyright retention and license requirements), while 72% are hybrid (28% compliant with license requirements). Of the journals included in this analysis, 13% only offer green open access and 11% have no open access option at all, according to our method based on Web of Science, Crossref, Unpaywall and SHERPA/RoMEO. Of all journals offering green OA for closed articles, 13% had zero embargo explicitly mentioned in SHERPA/RoMEO.

None of the four fully open access journals are key titles within the discipline in the WoS data. Hardly any to none of the largest traditional publishers such as Taylor and Francis, Oxford UP and Cambridge UP in this field have full gold open access journals dedicated to historical research. An example of OA-only journal publishers is Open Library of Humanities. Further examples of diamond (zero APC-) journals are *Public History Review*, *Historia Critica*, *The Historical Review/La Revue Historique*, *Interdisciplinary Studies in the Long Nineteenth Century* and *Studium*.

Most of the well known journals in the field are subscription journals with an option to publish articles open access against a fee (APC), known as hybrid journals. A few examples: Oxford University Press charges €2753 for an article in *Past & Present* and €2833 for an article in the *European Review of Economic History*. Cambridge University Press charges £1925 for an article in both *Modern Intellectual History* and J*ournal of Global History*. Wiley charges $3000 for the *Economic History Review* and lastly, De Gruyter charges €2000 per article, irrespective of the discipline or journal.

Embargo lengths for green open access imposed in this field are typically in the range of 0-36 months. Cambridge UP: on acceptance of the article, Taylor & Francis: 18 months, Oxford UP: 24 months. Berghahn: 24 months or 36 months for annuals.

Usage of open access options

There is a difference between the potential of open access routes as offered by journals and their uptake as reflected in the number of articles published via those routes. The following statistics are based on the data in WoS, and therefore should not be seen as representative for the field.

Full gold open access journals, that make up 4% of all journals in this field, account for 2% of articles published. Another 82% of articles are published in hybrid journals, that in themselves make up 72% of all journals in this field. Within hybrid journals, of the 179 articles published, 28% are gold open access. This is about equal to the percentage observed for arts & humanities as a whole (27%). Of the other, closed, papers in hybrid journals, 22% is available through green open access (self archiving in a repository), while 99% of hybrid journals in our sample allow green open access. While 54% of closed, subscription journals allow green open access, only 3% of papers in closed journals has indeed been archived in a repository (accepted manuscript and/or publisher version).

Some aspects of the publication culture

Societies play a very important role in this field. A few societies with their number of full open access journals are:

- American Historical Association: 1 hybrid journal
- Society for the History of the Humanities: 1 hybrid journal
- International Institute of Social History: 1 full OA journal and 1 hybrid journal.
- Canadian Historical Association: 1 delayed open access journal
- Oral History Association: 1 hybrid journal
- World History Association: 1 delayed open access journal
- Economic History Society: 1 hybrid journal
- Förderverein für Forschungen zur Geschichte der Arbeiterbewegung: 1 closed journal

In this field, publishing in non-English language journals is common in many countries, in Europe as well as countries in other parts of the world.

In the ten journals most often published in by cOAlition S/ERC/EC funded authors in this field, the average number of co-authors of a paper varies from 1 to 2. For papers with more than one author, few are co-authored by researchers from multiple organizations.

A few other developments in this field that are relevant for open access uptake are:
In addition to Societies there are a lot of smaller foundations and publishers that publish closed journals and have no Open Access options (yet). In addition, historians publish many articles/chapters in edited volumes and conference proceedings, for which less often than for articles in journals the option to publish open access is offered.

The analysis in this report is primarily based on Web of Science data. For History this has strong limitations. As with many other fields, Web of Science does not capture the huge diversity and long tail of journals in this field. The European Reference Index for the Humanities (ERIH PlUS) lists 1275 journals for the discipline of History of which 442 (34,6 %) have an Open Access option and 324 (25,4 %) are listed in the DOAJ. Additionally, the DOAJ lists 641 journals on the

subject History. Thus WoS likely does not give a representative image of the Open Access options for publishing in the field of History and more research is warranted.

Using the LENS database, we found that 22.5% of all open access papers in this field (published in 2017) have a Plan S compliant license (CC-BY/CC-BY-SA/CC0), and 0.7% a CC-BY-ND license (using ASJC subject categories in LENS).

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Appendix

A1. Journal size

To better interpret the data on availability and usage of open access options, it is useful to also have information on journal size (Fig. A1-2). To this end, we determined the percentage of journals in our sample that fell into different size brackets, from very large megajournals (>10,000 articles/year) to very small journals (1-10 articles/year). We also looked at the percentage of articles published in journals of different sizes.

Overall, the phenomenon of megajournals is clearly visible in the subset of DOAJ journals, where a small number of (very) large journals accounts for a sizeable proportion of article output. In addition, among hybrid journals, large journals are more prevalent than among pure subscription journals. Looking at the four main fields in our analysis, both effects are most pronounced for physical sciences & technology and life sciences & medicine. For social sciences and especially arts & humanities, open access journals (both full gold and hybrid) are most often smaller journals, not different from the overall journal size distribution in those fields . Another interesting effect concerns journals allowing green OA. We've observed that almost all hybrid journals allow green OA for non-OA articles, while only 50% of closed journals do so. The size distribution of journals allowing green OA tends more towards the larger journals than the distribution of all closed journals, at least in physical sciences & technology and life sciences & medicine.

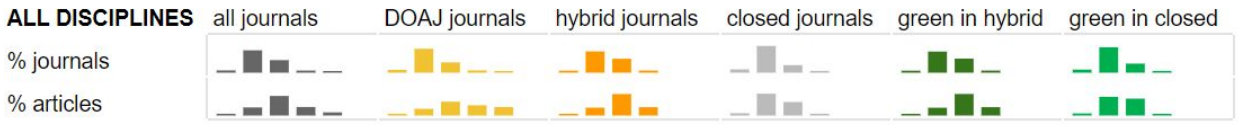
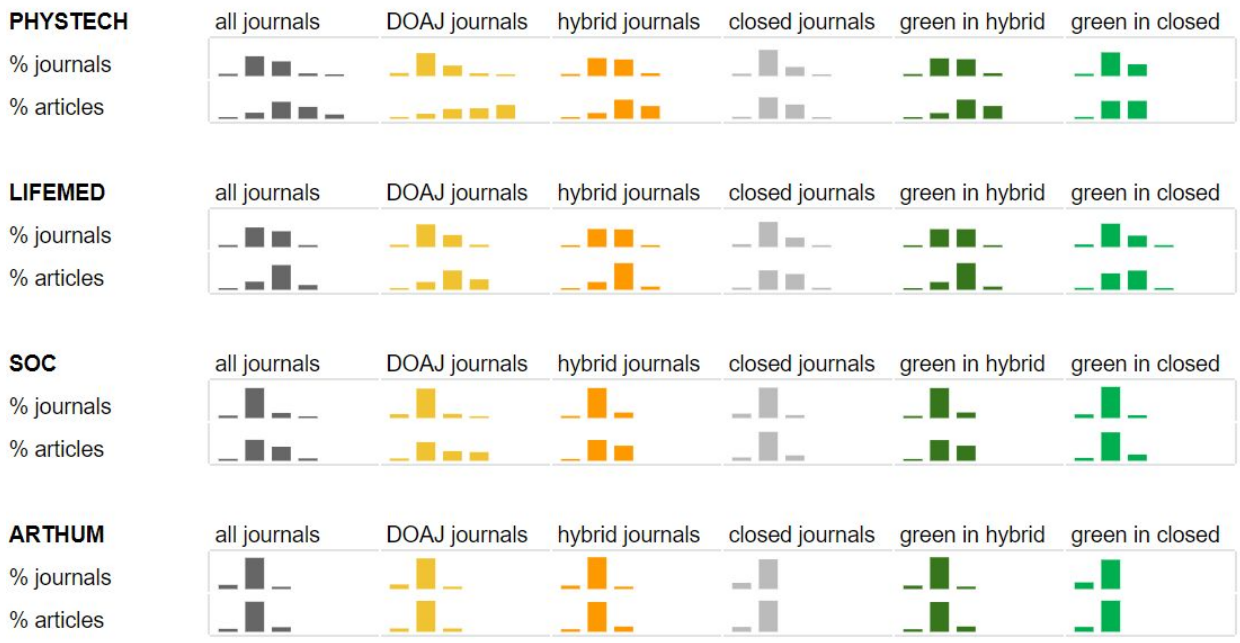


Fig. A1. Journal size distributions for types of journals in WoS, 2017



journal size brackets: 1-10, 11-100, 101-1000, 1001-10,000 and >10,000 articles/year

Fig. A2. Journal size distributions for types of journals in WoS, main disciplines, 2017

A2. Full gold OA journals - Publisher types and fee/no-fee journals

Using information collected by Crawford for all DOAJ journals (made available as GOAJ4 and the accompanying dataset), we mapped the proportion of DOAJ journals in our sample that are from full OA publishers, traditional publishers, society publishers and university publishers (including university presses) (Fig. A3). It should be noted that most societies that publish their journals with traditional publishers will have their journals categorized under 'traditional publishers', not 'society publishers'. The data are also available per subdiscipline (Fig. A4).

In terms of journal numbers, full gold OA journals in physical sciences & technology and life sciences & medicine are dominated by those from OA publishers and to a lesser extent traditional publishers, while in humanities if is mostly university/college publishers that offer these journals. Resulting numbers of articles published deviate somewhat from this, especially in physical sciences & technology where OA journals from traditional publishers are apparently very successful in attracting submissions, while in social sciences it is OA publishers that succeed to attract more papers that expected based on their number of journals.

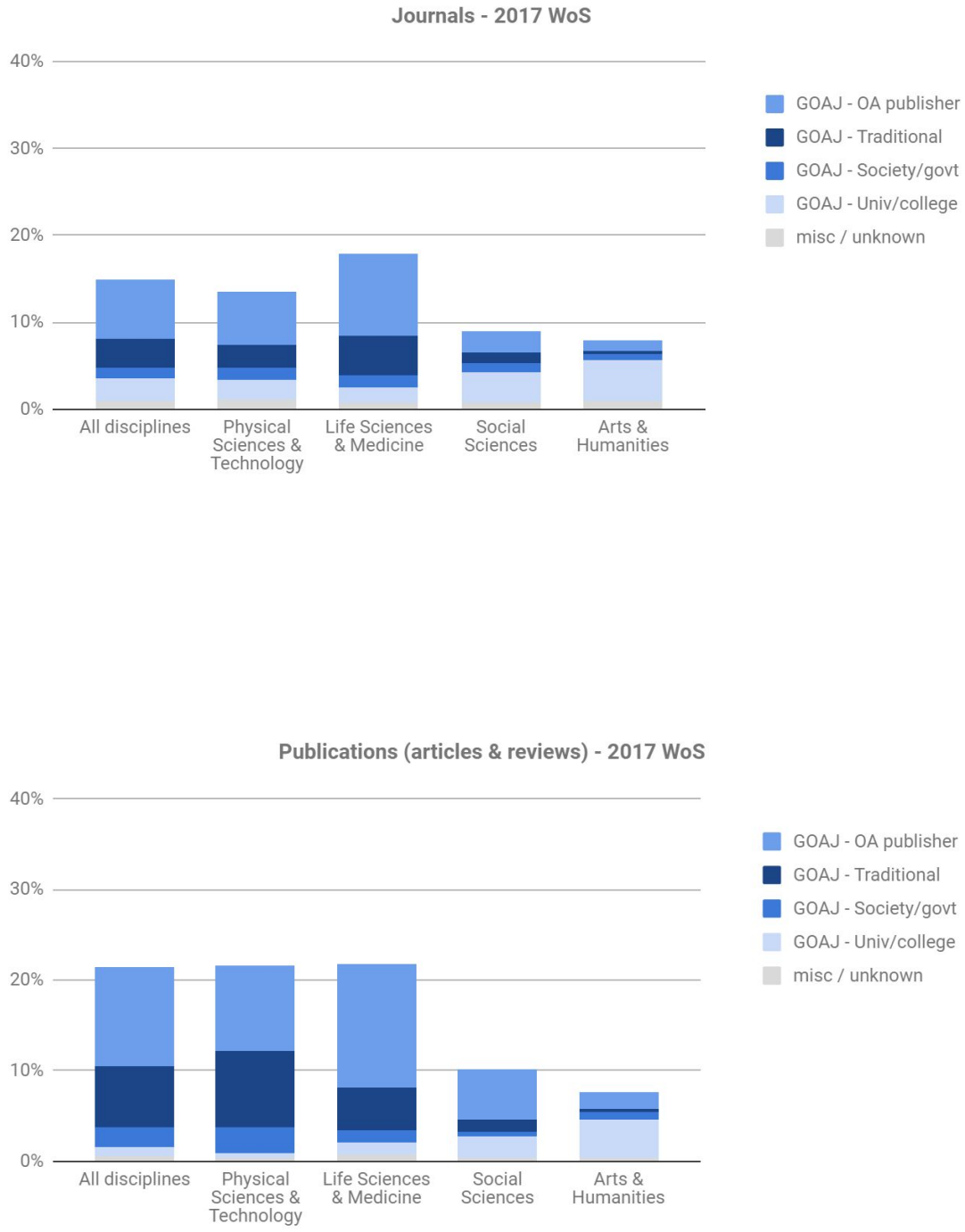


Fig. A3. Publisher types of full open access journals in WoS, total and main disciplines, 2017

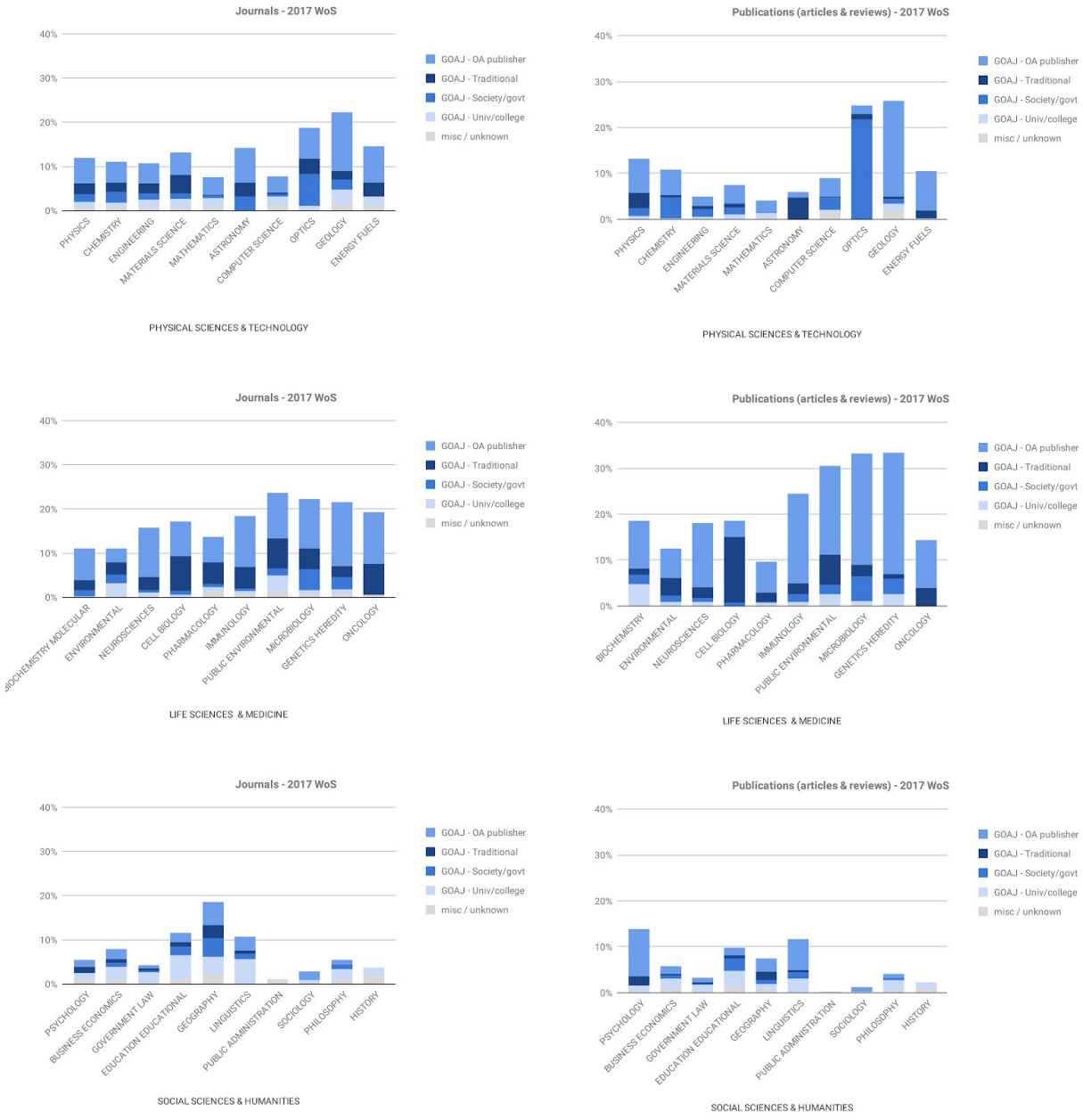
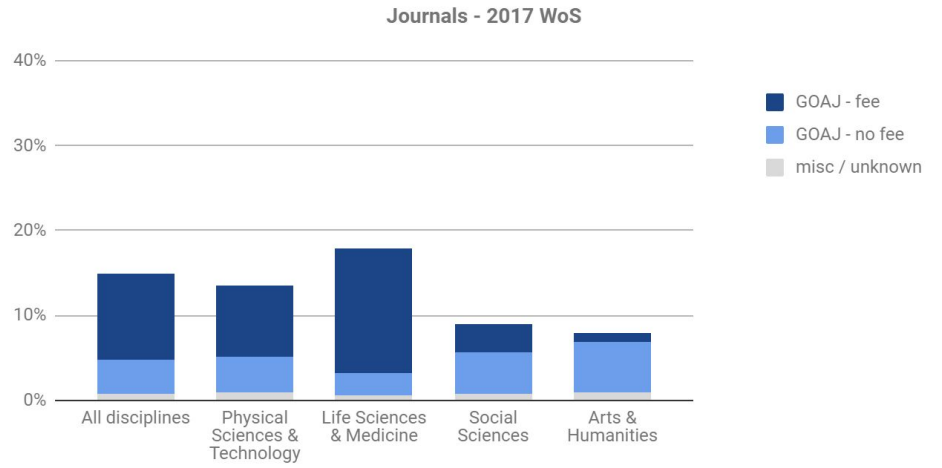


Fig. A4. Publisher types of full open access journals in WoS, subdisciplines, 2017

Using data from GOAJ4, we also mapped how many full OA journals in our sample charge fees, versus how many are no-fee journals (Fig. A5). The data on fees collected by Walt Crawford include normally-mandatory submission, processing and publishing fees (including required society membership). The data are also available per subdiscipline (Fig. A6).

In physical sciences & technology and life sciences & medicine, fee charging journals form the majority of full gold OA journals, while in social sciences and arts & humanities it is the other way around. For all fields publication in no fee journals is less frequent than one would expect based on the share of journals charging no fee.



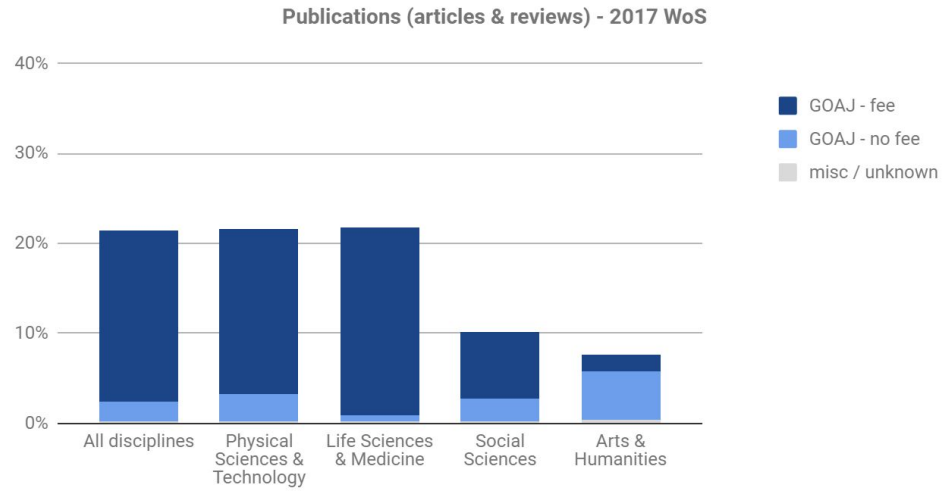


Fig. A5. Fee and no fee full OA journals in WoS, total and main disciplines, 2017

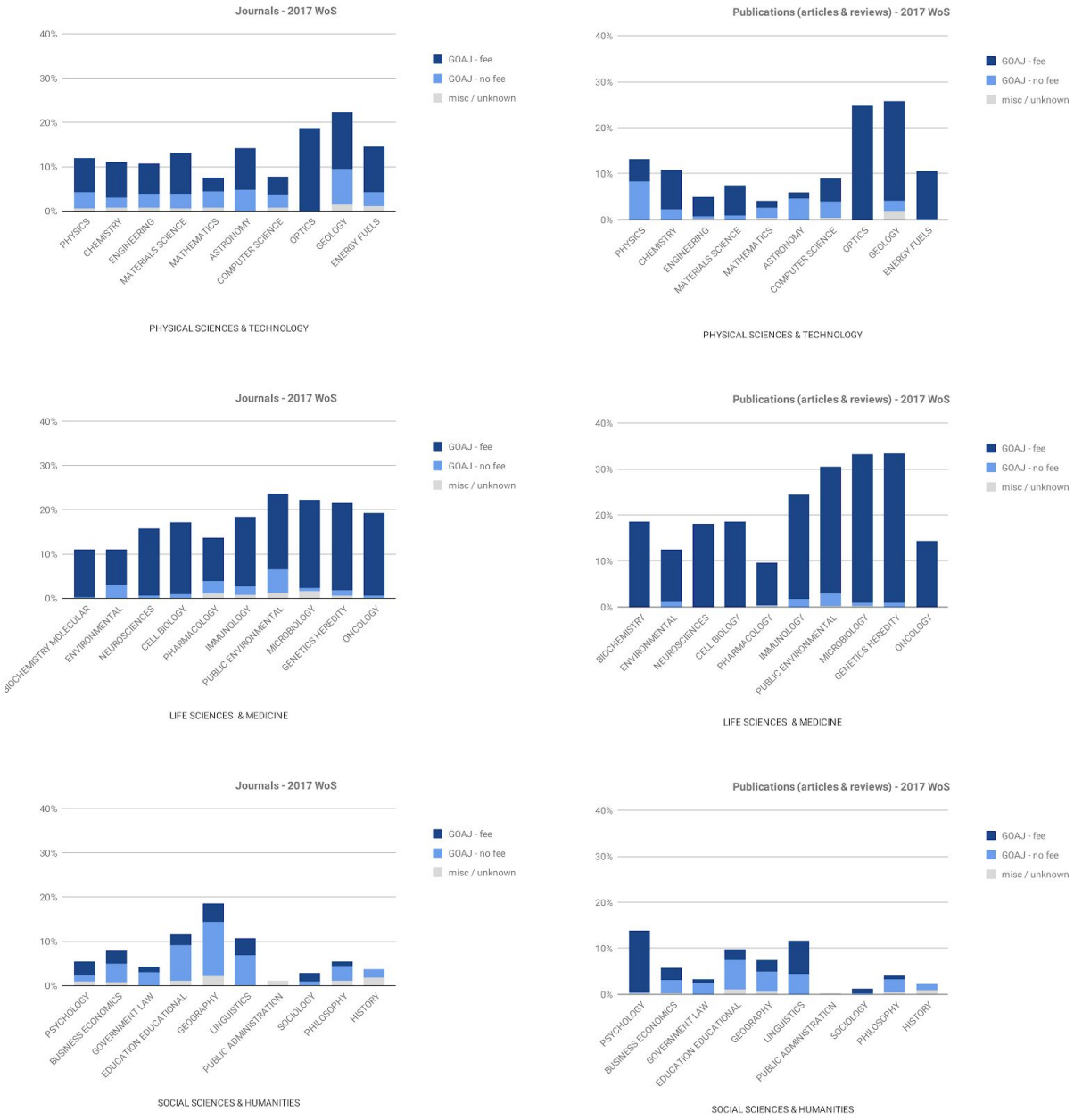


Fig. A6. Fee and no fee full OA journals in WoS, subdisciplines, 2017

A3. Coverage of social sciences and arts & humanities

In absolute numbers (see Fig. A7-8), Scopus has more journals classified as social sciences or arts & humanities than Web of Science. Other multidisciplinary databases (Dimensions, Microsoft Academic and Lens.org) don't allow easy detection of number of included journals per discipline (an overview of number of articles in these databases is included in the appendix). Both DOAJ (which contains only full OA journals) and ERIH (specific for arts & humanities) contain more arts & humanities journals than Web of Science. Not surprisingly, databases that are not selective, but rather aim to be comprehensive, like the Elektronische Zeitschriftenbibliothek (EZB) and the ISSN registry include many more journals in both disciplines (although both also include periodicals that are not journals). The same holds for ROAD, that lists full OA journals. On the other end of the spectrum, the OA2020 list of frequently cited DOAJ-listed journals only includes a handful of journals in both social sciences and arts & humanities.

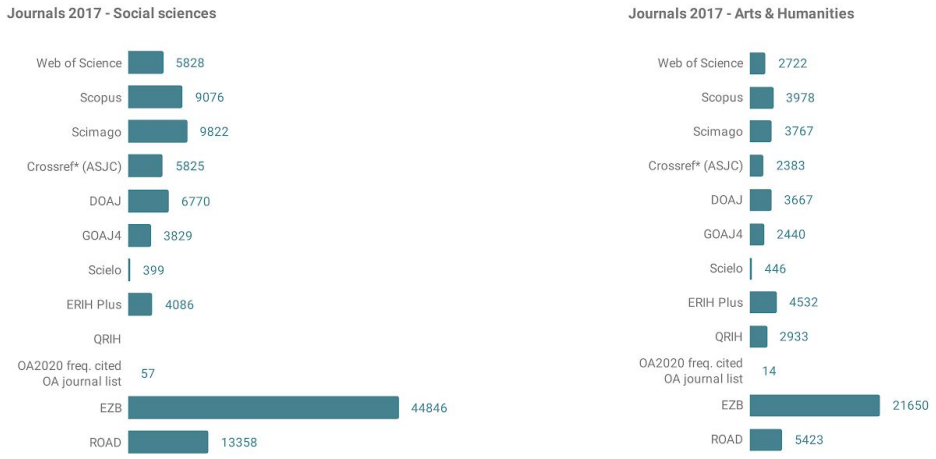


*Fig A7. Number of journals (with articles published in 2017) classified as social sciences and arts & humanities, respectively, in various databases; *journals with articles published in 2017-2019*

*Fig A8. Number of journals classified (with articles published in 2017) as social sciences and arts & humanities, in various databases including ISSN; *journals with articles published in 2017-2019*

While different arguments can be made on the value of selectivity and the criteria employed, the results at the very least show the existence of many more journals than those included in Web of Science in both social sciences and arts & humanities. Another issue is the relative bias in databases like Web of Science towards life sciences and physical sciences. Comparing the relative proportion of journals classified as social sciences or arts & humanities in different databases shows that many other multidisciplinary databases, including DOAJ, Scielo, EZB and ROAD/ISSN indeed have a greater proportion of social sciences and arts & humanities journals compared to Web of Science and Scopus (Fig. A9).

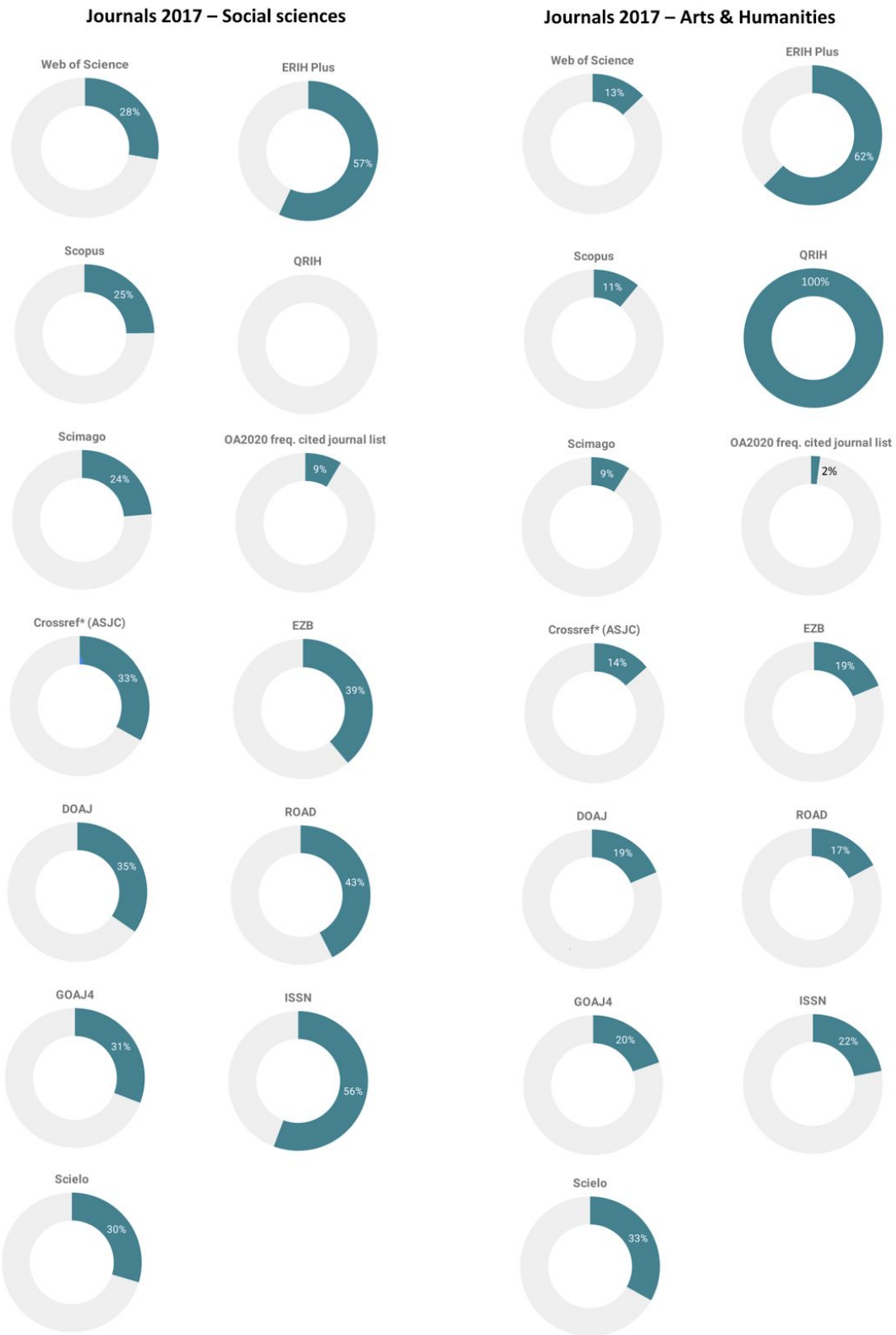


*Fig A9. Percentage of journals classified (with articles published in 2017) as social sciences and arts & humanities, in various databases; *journals with articles published in 2017-2019.*

Comparing the coverage of different fields across databases is further complicated by the different classification systems used in these databases, as well as by the way these classifications are applied (at journal or article level, with multiple categories assigned to each journal or article or not, etc.). The effects of such differences in classification can be seen when comparing for instance Scopus vs. Scimago, and DOAJ vs. GOAJ4. In addition, in some databases not all journals or articles have subject classifications assigned, as is the case in Crossref and Lens (which include ASJC subjects for a subset of journals only).

One of the examples of the effect of classification choices within a database is that both WoS and Scopus have quite some journals labelled as arts & humanities journals that do indeed focus on an arts & humanities subject, but from a science perspective (e.g. *International Journal of Conservation Science* or *Musica Scientiae*) adding at least to the perception that these journals have a biased set of arts & humanities journals. Also, some journals classified as arts & humanities journals in these databases are journals in other disciplines that also include some articles from an arts & humanities perspective.

A4. Database characteristics

Table A1 lists a number of database characteristics that influence the potential usage of these databases in analyses of OA options and usage in different disciplines and at funder or institutional level. At minimum, these require availability and export functionality of journal title information (including ISSN and eISSN), number of articles per journal, funding and affiliation information and subject classification. Regarding OA-specific information such as type of OA journal (full OA, hybrid and/or allowing green OA), licenses, copyright retention, embargo periods etc, this information should ideally be available at article level, as well as available for batch- or frequency export at journal level. The list of databases included here is not exhaustive - we did, for instance, not include Cabells' Whitelist and Ullrich's Periodical Directory as we do not have access to them.

DATABASE	SUBJECT CLASSIFICATION	NO. ARTICLES	NO. JOURNALS	JOURNAL TITLES	ISSN	OA DETECTION	CC LICENSE INFO	AFFILIATIONS	FUNDING	BATCH EXPORT (RECORDS)	FREQ. EXPORT (JOURNALS)
Web of Science	WoS	Y	Y	Y	Y	Y	N (implicit CC for hybrid)	Y (96%)	Y (62%)	Y	Y
Scopus	ASJC	Y	Y	Y	Y	Y	N	Y (96%)	Y (?%)	Y	N ?
Dimensions	ANZSRC (FoR)	Y	-	Y	N	Y	N	Y (?%)	Y (?%)	Y	N ?
LENS	MA (FoS) (84%) ASJC (51%)	Y	-	Y	?	Y	Y	Y (60%)	Y (19%)	Y	N ?
Microsoft Academic (MA)	MA (FoS)	Y	-	Y	?	N	N	Y ?	N	N (via API?)	N ?
Crossref [current DOIs 2017-2019]	ASJC (69%)	Y	Y	Y	Y	based on licenses	Y	Y	Y	via API	via API?
DOAJ	LCC	Y	Y	Y	Y	all OA	Y	N	N	Y (data dump)	N
GOAJ4	custom	Y	Y	N	N	all OA	N	N	N	Y (dataset)	Y (dataset)
Scielo	custom	-	Y	N	N	all OA	N (CC-BY required after 2015)	N	N	Y (journal list)	N
SherpaRomeo	-	-	-	Y	Y	at journal level	from policies	N	N	Y (limited fields) + API	N
ERIH Plus	custom OECD (Frascati)	-	Y	Y	Y	Y (OA, DOAJ)	N	N	N	Y (journal list) no OA/DOAJ values	N
QRIH	custom		Y	Y	Y	N	N	N	N	Y (journal list)	N
EZB	custom	-	Y	Y	Y	Y	N	N	N	N	N
BASE	DDC (19%)	Y	-	Y	Y	Y	Y	N	N	N	N
OA2020 frequently cited OA journal list	ASJC / LCC	-	Y	Y	Y	all OA	N	N	N	N	N
Scimago	ASJC	Y	Y	Y	Y	Y (full OA only)	N	N	N	Y (download)	included in download
ROAD	DDC (modified)	-	Y	Y	Y	all OA	N	N	N	N	N
ISSN	DDC (modified)	-	Y	Y	Y	Y (via ROAD)	N	N	N	N	N

Table A1. Characteristics of databases, focusing on detection options for assessing potential and usage of Plan S-compliant publishing options (at journal- and article-level). Percentages indicate proportion of records (publication year 2017) which include information on subject classification, affiliation or funding, respectively.

A5. Coverage of newer full OA publishing venues

To assess the extent to which newer (and smaller) journals, especially overlay journals and diamond (no-fee gold) OA journals are currently included in the various databases used in this gap analysis, we looked at a sample of full gold OA journals, namely those included in the Open Library of Humanities (OLH), Free Journal Network (FJN), Episciences and Open Research Central (Table A2). The results show that while the majority of diamond OA journals included in the Free Journal Network are included in WoS (many of them currently in the Emerging Sources Citation Index), many other journals in this sample are not (yet) included in WoS. Most, though not all, of the journals in this sample do have an ISSN and use (Crossref) DOIs, which is a point of attention for the respective journals/publishers.

collection	OA journal type	journals	with ISSN	in Crossref	in DOAJ	in WoS	in WoS (ESCI)
Open Library Humanities (OLH)	diamond	24	24	24	19	8	7
Free Journal Network (FJN)	diamond (some overlay)	49	49	35	34	35	20
Episciences	diamond (overlay)	12	10	2	4	4	1
Open Research Central	APC-based gold	8	8	8	3	0	0

Table A2. Coverage of a selection of full OA journals in various databases; ESCI - Emerging Sources Citation Index in WoS.