



## Description

The fight for open access is almost 15 years old now. Has it made real gains? Open access (OA) remains controversial and obviously threatens commercial journal publishers that profit from expensive paywalls and subscriptions. A [new large-scale study](#) by Piwowar *et al.* investigates the prevalence and features of OA usage, namely of green OA, gold OA, and hybrid OA. Their findings bode well for open access articles becoming the main way to publish academic research. In particular, they call attention to a new kind “bronze OA”.

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## Studying Open Access

The new 2017 study is aptly titled, “The State of OA: A large-scale analysis of the prevalence and impact of Open Access articles”. It is currently available online at *PeerJ*, as a preprint.

In this timely work, the authors first review the key literature of OA. Not surprisingly, the term OA lacks a firm and defined definition. For their empirical analysis, a working definition is given: “*free to read online, either on the publisher’s website or in an OA repository*” In practice, however, OA takes various forms, so it is [categorized in four ways](#): green OA, gold OA, and hybrid OA, and the newly dubbed “bronze OA”. All other articles were considered “closed” OA.

In green OA, the articles are self-archived in an online repository, as preprints or the published version, with no re-use rights. By contrast, in gold OA, you publish in a journal that makes all their online articles directly free to read and re-use. In hybrid OA, you pay for an open license from a for-profit subscription journal (like Elsevier). Finally, although bronze OA lacks a license, it is temporarily free to read only on the publisher's website.

## Aims and Approach of the Study

Past attempts at determining OA prevalence had methodological problems. So Piwowar *et al.* did their own empirical investigation, distinguishing among the types of OA used. Furthermore, given that some studies suggest there is an “open access citation advantage”, the authors evaluate this, too.

To check their OA categorization, they used the open-source DOI aggregator web service called “oaDOI”. It has nearly 88 million records for Crossref DOIs. Importantly, they used a subsample (n = 500 articles) to verify the accuracy of oaDOI via manual online searches. Indeed, oaDOI could be trusted 96.6% of the time in accurately reporting an article as “open” (versus “closed”).

To estimate the percentage of OA in the literature, a random sample of 100,000 journal articles with Crossref DOIs (in all years) were used (total population size = 66,650,153). In order to estimate the OA citation impact and prevalence by discipline, another 100,000 articles from Web of Science from 2009-2015 were sampled (out of 8,083,613). To further gauge OA prevalence, another 100,000 articles were sampled (out of 213,323) over a 1-week period, as accessed by [users of the browser extension](#) called Unpaywall. This tool lets users freely read paywalled papers.

## OA Prevalence

A 2017 European Union study of the OA market pegged that, globally, OA prevalence was just 5%. However, that methodology apparently did not consider green OA. By contrast, Piwowar *et al.* find that OA accounts for 27.9% of the scholarly literature as a whole (36.1% for the Web of Science sample). The percent prevalence reached 45% in 2015, suggesting that OA is growing fast. However, the main contributor to this trend is not green OA (just 7% of the whole), nor gold and hybrid OA—but rather the bronze OA.

This result means that most of the OA articles occur on websites without an open license. Who are these publishers, providing articles for reading only, as “gratis OA” (i.e., with no re-use rights)? Clearly, we need to learn more about bronze OA and its features, especially what proportion of this literature is actually peer-reviewed or not.

Another key result is the Unpaywalled sample. Basically, almost half of the articles searched for (47% vs. 53% that were closed OA) were legally available somewhere online in some form of OA. Most of these were bronze OA (15.3%) followed by gold OA (14.3%), green OA (9.1%), and hybrid OA (8.3%)<sup>4</sup>. According to Piwowar *et al.*, this relatively high OA readership might make “Big-deal” subscription packages unnecessary for universities.

## OA Citation Advantage

Being freely and widely available online, many argue that OA must surely offer an article a citation advantage. Wouldn't you be more likely to cite a work you have actually been able to download and read? Not all institutions, even in Western countries, can afford unfettered access to all the subscription journals from the commercial publishers. Indeed, readers tend to access more OA than closed articles behind a paywall.

Piwowar *et al.* find that support for this view using the metric, average relative citation (ARC). Generally, a typical OA article is, on average, cited 18% more often than a closed article (ARC = 1.18 vs. 0.90, respectively). Second, they find this advantage comes mainly from green OA and hybrid OA, and not the gold OA. This result agrees with an [earlier longitudinal study](#) by Dorta-Gonzalez *et al.* They found no discernible citation advantage between 2009 and 2014 for researchers who used gold OA. (This was true at both the journal and article level of analysis.)

## Impact and Looking Ahead

The movement towards open access articles in [academic research has its challenges](#). However, the tide is turning. The citation advantage and positive citation impact for researchers, especially by green OA and hybrid OA, and increasingly now, bronze OA, cannot be ignored. In addition, avoid using pirate websites like *Sci-Hub* that let users illegally access 85% of the papers of [subscription journals protected by a paywall](#). The problems caused by this "black OA" should increase the pressure to adopt legal OA by the academic research community. Open access articles are the future, whether for-profit journal publishers like it or not.

Have you published in any of the different forms of open access? How has your experience been? Share your thoughts with us in the comments below!

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