Open access in addictions, associated data, and collaboration between countries

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ABSTRACT
Open access (OA) publications and the publication of associated data represent fundamental pillars of open science. The existence or absence of OA and the type of access available may be contingent upon the presence or absence of associated data. The two policies of scientific production may be of interest for advancing knowledge in the field of addictions due to their significant social and health impact. This study aims to ascertain how the publication patterns of articles on addictions have evolved over the past two decades, to determine the relationship between these patterns and the presence of associated data, and to investigate whether cross-country collaboration varies depending on whether the articles are published in OA journals. In order to conduct this study, a comprehensive search was conducted using the Web of Science Core Collection database, with the objective of retrieving all articles related to addiction. Additionally, the PubMed database was consulted in order to ascertain the presence of associated data. The total number of articles published during the period between 2003 and 2022 is 67,027. Of these, 51% were published in OA journals, with the "green accepted" and "green published" routes being the most frequent. However, these routes have declined over time, with a shift towards the "gold" and "gold-hybrid" routes. The "green accepted" and "free to read" models exhibit the highest percentage of articles with associated data. Nevertheless, the different types of access, OA or non-OA, are inconsequential for a higher percentage of papers with associated data. The data indicate that there is no discernible difference between the countries' collaborative efforts based on the publication status, with the United States exhibiting the highest level of involvement in both OA and non-OA contexts.

Keywords: addiction, open access, international collaboration

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1. INTRODUCTION

The advent of open science has given rise to a number of controversies within the field of addiction research, primarily due to its implications for public policy (Monaghan, 2011). Nevertheless, it presents a promising avenue for future research (Scheibein et al., 2022). These open science practices include, among others, the registration of projects, the use of open data, open access (OA) to publications, quality control, reproducibility, control of sessions in publications, and the allowance of a thorough examination of the evidence transferred (Louderback et al., 2023; Munafò & West, 2020). Additionally, open science has been considered an accelerator of research (Woelfle et al., 2011). Similarly, open science and access to gambling and associated problems have resulted in increased citations (Louderback et al., 2023). In the field of addiction research, open science is gradually being addressed (Scheibein et al., 2022). The necessity for its immediate implementation in studies examining novel consumption patterns, such as those related to electronic cigarettes, has been emphasized (Munafò & West, 2020). In this vein, the journal *Addiction* has permitted authors to participate in the Open Science badge program of the Center for Open Science since 2018 (Addiction endorses the Open Science badge scheme, 2022). A study conducted in 2020 on the

practice of data sharing in randomized clinical trials in the field of addiction revealed that none of the trials had shared their data (Vassar et al., 2020). Additionally, a separate study demonstrated that only 4.7% of addiction articles indexed in PubMed Central contained supplementary material (Vidal-Infer et al., 2019).

One of the earliest actions in the field of open science was the implementation of the OA policy for journals and articles in the SciELO (Scientific Electronic Library Online) project in 1998. This was subsequently followed by a series of declarations on the subject, including the Budapest Open Access Initiative Declaration (BOAI, 2002), the Bethesda Declaration on Open Access Publishing, and the Berlin Declaration on Open Access (2003). A second action in open science, which has been prioritized in international funding policies for research projects, has been the importance of open data. The term "open data" emerged in 1995 in a U.S. agency report on geophysical and environmental data dissemination (Connor, 2023).

The definition of OA in relation to published works encompasses a number of established routes (green, gold, bronze, diamond), the most prevalent of which are "green" (self-archiving in an institutional or thematic repository) and "gold" (institutions or funding agencies remunerate publishing companies for the publication of their articles). The Web of Science (WoS) database employs a different classification system, ranging from "gold" to "green submitted" publications. It is possible for the same scientific work to be included in different types of OA. With regard to open data, it is evident that the goal of ensuring the availability of all open data has not yet been met. Nevertheless, data associated with publications can accommodate various formats, including open data (Sixto-Costoya

et al., 2022). It is hypothesized that articles disseminated through more open-access channels have a greater availability of associated data and that there are differences in the collaborative networks between countries when they publish or not in OA. The objective is to analyze the evolution and determine if there is a correlation between the OA routes of articles on addictions from 2003 to 2022 and the existence of associated data or if there are differences in the collaboration networks.

2. METHODOLOGY

The databases utilized in this study were the WoS Core Collection and PubMed. The WoS was employed to identify pertinent articles on substance abuse, while the PubMed database was utilized to retrieve papers with associated data according to the access type designated by WoS. The inclusion criteria were as follows:

- The document type was limited to articles.
- The articles were published between 2003 and 2022.

The articles were included in the thematic category "substance abuse" of the WoS.

The search was conducted on October 10, 2023. The OA typologies assigned to each article were obtained from WoS: gold (gold or gold-hybrid), free to read, and green (published, accepted, or submitted), as well as the authors' countries of affiliation. Subsequently, a PubMed search was conducted using the PubMed identification number (PMID) of the retrieved articles. This allowed us to determine whether the articles had associated data according to the type of access contemplated in the WoS. The data analysis involved calculating the frequencies of each of the

OA typologies and the presence of associated data. The VOSviewer program was used to represent the visual representation of collaboration between countries.

3. RESULTS

3.1. Open Access

The total number of articles published between the years 2003 and 2022 is 67,027. Of these, 34,201 (51%) are in the OA category. Figure 1 illustrates the evolution of the articles according to whether or not they are published in OA journals. It demonstrates that OA articles began to predominate in 2009, and since then, they have accounted for between 50% and 60% of the total number of articles.

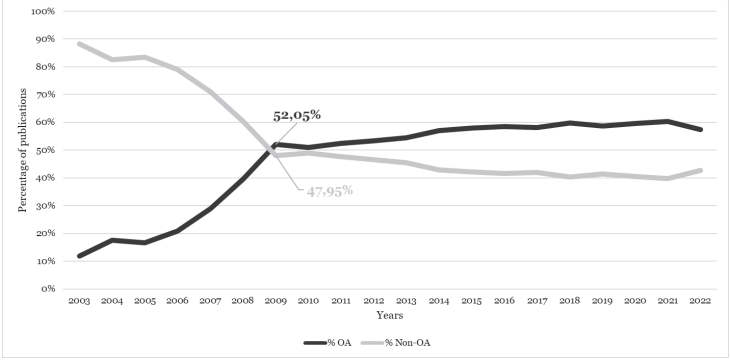

Figure 1. Evolution of articles according to whether they are published in OA or non-OA.

The most prevalent OA typologies are "green accepted" (57% of the articles) and "green published" (33.6% of the articles). The remaining typologies are present in 12% of the articles, and an article can be assigned to multiple types of access. Figure 2 illustrates the evolution of the articles according to OA typology, demonstrating that the "gold"

and "gold-hybrid" typologies have exhibited a gradual increase over the two decades, while the "green accepted" typology has demonstrated a decline.

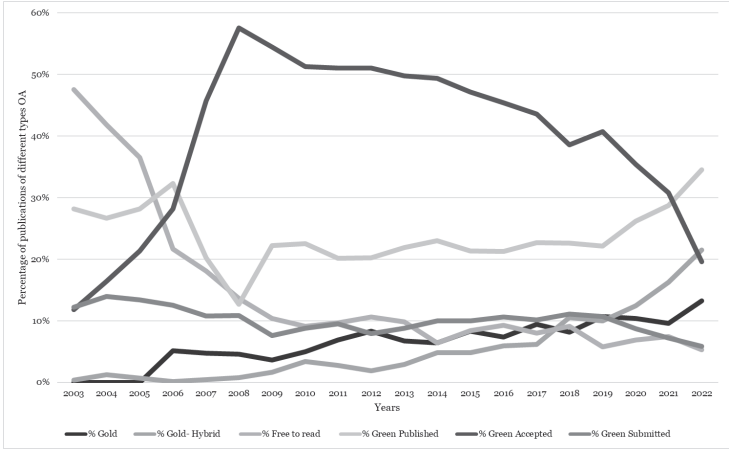

Figure 2. Annual evolution of OA publications according to the different types of OA.

Figure 3. Map of countries with OA percentage of their articles above 23%.

The countries with more than 100 articles and the highest percentage of OA publications are Ukraine, Lebanon, Vietnam, and South Africa. The United States is in the 10th position (Figure 3).

3.2. According to the Access Model

As illustrated in Figure 4, the evolution of the percentage of publications that have associated data according to PubMed exhibited a notable surge in 2012, followed by a decline in 2015 and a subsequent rise in all OA models sustained until 2018, after which a decline was observed. The "green accepted" and "free to read" models exhibit the highest percentage of articles with associated data. No discernible differences are observed in the percentage of related data according to whether the articles have been published in OA.

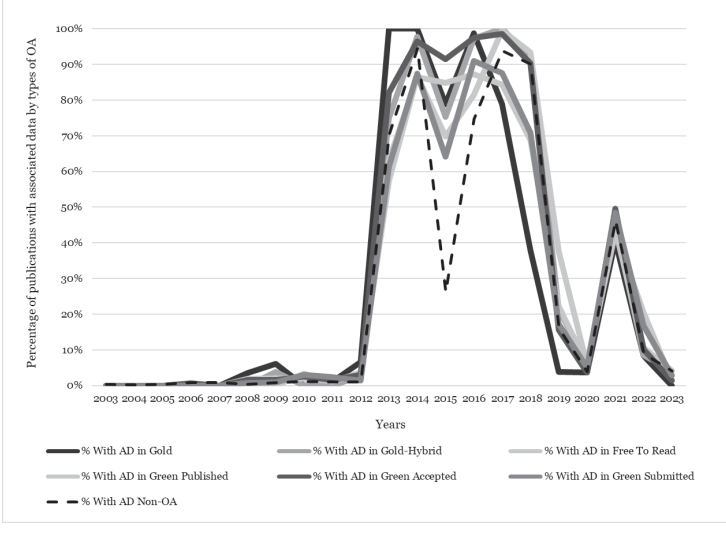

Figure 4. Evolution of the presence of associated data according to type of access.

3.3. Cross-Country Collaboration Networks for Open Access Articles

Figure 5 illustrates the collaborative network of countries that have published articles in OA journals. The United States occupies the first position, with 23,980 published papers and collaborates with 131 countries. Among these, Canada ($n_{\text{Link Strength}}$ = 919), Australia ($n_{\text{Link Strength}}$ = 653), England ($n_{\text{Link Strength}}$ = 634), and China ($n_{\text{Link Strength}}$ = 344) stand out as particularly prominent partners. England occupies the second position, with 3,226 published papers and 78 countries with which it is linked, primarily Australia ($n_{\text{Link Strength}}$ = 501) and Canada ($n_{\text{Link Strength}}$ = 310). Canada is in third position, with 2,406 papers and 87 countries with which it is linked. Australia is in fourth position, with 636 publications and 85 countries with which it is linked overall.

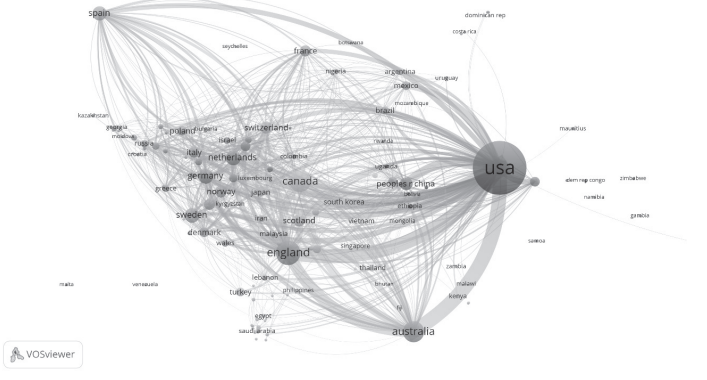

Figure 5. Collaborative networks of countries in OA publications.

3.4. Cross-Country Collaboration Networks for Non-Open Access Articles

Figure 6 presents a visualization of the collaboration between countries for non-OA publications. The United

States occupies the top position in terms of the number of published papers, with 15,723, and has collaborated with 125 countries. Among these, Canada ($n_{\text{Link Strength}}$ = 502), Australia ($n_{\text{Link Strength}}$ = 358), China ($n_{\text{Link Strength}}$ = 257), and England ($n_{\text{Link Strength}}$ = 210) stand out as particularly prominent partners. Australia is in second place, with 3,393 published papers linked to 79 countries, including England ($n_{\text{Link Strength}}$ = 223), Canada ($n_{\text{Link Strength}}$ = 179), and New Zealand ($n_{\text{Link Strength}}$ = 552). Canada occupies the third position, with 2,766 published documents and 78 countries with which it is linked, particularly Germany ($n_{\text{Link Strength}}$ = 124) and England ($n_{\text{Link Strength}}$ = 92). England is in fourth position, with 2,194 published documents and 64 countries with which it is linked, especially Scotland ($n_{\text{Link Strength}}$ = 117) and Italy ($n_{\text{Link Strength}}$ = 93).

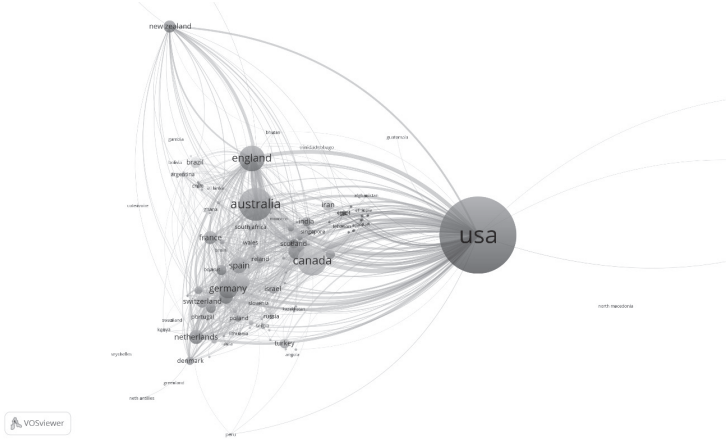

Figure 6. Collaborative networks of countries in non-OA publications.

4. CONCLUSION

This study demonstrates that OA publications in the field of addictions have been on the rise over time, a trend that is

also evident in the broader landscape of scientific research. The implementation of the various forms of OA has not been significantly correlated with an increased presence of associated data. The proportion of articles with associated data in those non-OA is comparable to other access routes. The study demonstrates that a considerable number of papers in the field of addiction continue to be published without OA. Consequently, it would be prudent to maintain the implementation of public policies that promote OA publication and the presentation of raw research data as associated data. In contrast, the examination of the associated data indicates that PubMed may be experiencing difficulties in accurately allocating associated data due to the fluctuations observed in certain years, such as in 2015 and 2019. Consequently, the data presented in the study should be interpreted with caution. It is noteworthy that the United States occupies a central position within the collaborative networks of publications, irrespective of whether they are in OA. This may be attributed to the Anglo-Saxon bias inherent in the database utilized. Furthermore, while the United States ranks first in terms of the production of OA articles, it currently occupies 10th position with regard to the percentage of OA articles in relation to its total production.

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Conflict of interest

The authors declare that there is no conflict of interest.

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