



EDITORIAL NOTE

A brief summary of the impact and performance of different scientific fields at the AABC

ALEXANDER W.A. KELLNER

Bibliometric indexes are being broadly used for evaluations with an increasing number of different applications (e.g., Ioannidis et al. 2019), sometimes leading to questionings (e.g., Hicks et al. 2015). Scientific periodicals have also been under scrutiny (e.g., Butler 2013), an increasing tendency as more challenges for the publication industry are presented and problems exposed (e.g., Amaral 2018).

In a series of editorials, including this one, I have made an attempt to get a sense of how publications from different scientific fields are impacting the bibliometric indexes of the Annals of the Brazilian Academy of Sciences (AABC; Kellner 2020a, b, c). Here I will proceed with this assessment and also present a brief summary of the influence of all areas on the 2019 Impact Factor (IF) of this journal, focusing on the articles published during 2018 (Table I). Of the 10 major scientific fields to which the manuscripts of the AABC are presently directed (Kellner 2020a), the remaining three to be examined are Biomedical, Health and Social Sciences (Fig. 1). No data is available for Physical Sciences since no article related to this field was published during 2018.

Of the 13 articles published in Biomedical Sciences, seven were cited during 2019, resulting in an Article Citation Factor (ACF, see Kellner 2020a) of 0.5385. The Impact Factor (IF) if only publications of this scientific field are considered is 1.000, lower than the 2019 IF of the AABC (1.280). Considering only cited papers, the Reescalated Article Impact Factor (RAIF, see Kellner 2020a) is 1.857.

A total of 13 articles were published during 2018 in Health Sciences, five of which were cited at least once during 2018. The ACF is surprisingly low (0.3846), and if only articles of this field are considered, the IF of the AABC would be 0.615 – less than half of the current IF of the journal (1.280). The RAIF regarding Health Sciences is 1.600.

The last area to be considered here is Social Sciences, with only 5 articles published during 2018, two of which received one citation each. The ACF is 0.4000, with an IF of 0.400 – the lowest of the journal. RAIF is also low (1.000), the same as the one of Engineering Sciences (Kellner 2020c).

Overall, the evolution of these three areas is somewhat similar, with a steady increase in submissions and rejection rates (Fig. 1). Biomedical Sciences has shown some fluctuations in the numbers of rejected and published articles (Fig. 1a). Submission rates have also changed over the years, but tended to grow, although not at the same pace as other areas (Kellner 2020a, b, c).

Health Sciences shows a more uniform growth, with a greater positive slope from 2017 on (Fig. 1b). This area only started at the AABC in 2012 and before that, manuscripts related to this field were either included in Biomedical or Biological Sciences. Since 2016, there is a tendency of growth, and in

several years, it became the third scientific field with the most submitted manuscripts, only behind Agrarian and Biological Sciences (Kellner 2020a, b).

Regarding Social Sciences, despite the gradual growth in submissions, the actual number of published articles is quite low and the overall contribution to the AABC is limited in all respects (Fig. 1c).

This brief exercise looking at articles of distinct scientific fields published by the AABC and how they affect the IF of this journal has provided some interesting results, even though additional studies are needed before more robust conclusions can be achieved. One quite unexpected outcome of these analyses is the discovery of the possibility that published articles can permanently disappear from the JCR. The AABC has had one problem with this before (Kellner & Azevedo 2013) but regarded it as an isolated case. However, here I accidentally detected the omission of more 15 articles, this time of Agrarian Sciences at the 2019 JCR platform, leading to the introduction of the Missing Article Index (MAI, see Kellner 2020a, b). Considering Agrarian Sciences, MAI is 0.1230 showing that about 12% of the articles published by the AABC in 2018 concerning this scientific field were not considered in the JCR of 2019 (see Kellner 2020b for comments on potential consequences). A second area affected

Table I. Scientific fields, citations and indexes concerning the articles published by the Annals of the Brazilian Academy of Sciences in 2018.

Areas	Art Pub 2018	Art JCR 2018/2019	MAI 2018/2019	Cit Art 2018/2019	Cit 2018/2019	Cit MCAr 2018/2019	ACF 2018/2019	IF 2018/2019	RAIF 2018/2019
MaSci	6	6	0	2	3	2-1-0	0.3333	0.500	1.500
PhSci	0	0	0	0	0	—	0	0	0
ChSci	41	41	0	29	105	8-8-7	0.7073	2.561	3.621
EaSci	28	26	0.0714	16	46	17-5-3	0.6154	1.769	2.875
				15*	29*			1.160*	1.933*
BiSci	65	65	0	27	43	6-3-3	0.4154	0.662	1.593
BmSci	13	13	0	7	13	5-2-2	0.5385	1.000	1.857
HeSci	13	13	0	5	8	3-2-1	0.3846	0.615	1.600
AgSci	122	107	0.1230	43	70	4-3-3	0.4019	0.654	1.628
EnSci	7	7	0	3	3	1-1-1	0.4286	0.429	1.000
SoSci	5	5	0	2	2	1-1-0	0.4000	0.400	1.000
AABC-90	300	283	0.0567	134	293	17-8-8	0.4735	1.035 [~]	2.187

Abbreviations of Scientific Areas: AgSci – Agrarian Sciences, BiSci – Biological Sciences, BmSci – Biomedical Sciences, ChSci – Chemical Sciences, EaSci – Earth Sciences, EnSci – Engineering Sciences, HeSci – Health Sciences, MaSci – Mathematical Sciences, PhSci – Physical Sciences, SoSci – Social Sciences. **Other:** AABC-90 – complete volume considering all areas, ACF 2018/2019 – Article Citation Factor concerning articles published in 2018 cited in 2019, Art JCR 2018/2019 – number of articles published in 2018 found in the Journal Citation Reports of 2019, Art Pub 2018 – number of articles published in 2018, Cit 2018/2019- number of citations in 2019 of articles published in 2018, Cit Art 2018/2019 – number of articles published in 2018 cited in 2019, Cit MCAr 2018/2019 – number of citations in 2019 of the three most cited articles published in 2018, IF 2018/2019 – Impact Factor of 2019 concerning articles published in 2018, MAI 2018/2019 – Missing Article Index concerning articles published in 2018 not retrieved by the Journal Citation Reports of 2019, RAIF 2018/2019 – Reescalated Article Impact Factor concerning articles published in 2018 cited in 2019. *excluding the most cited article, [~]excluding citations of letters and editorials.

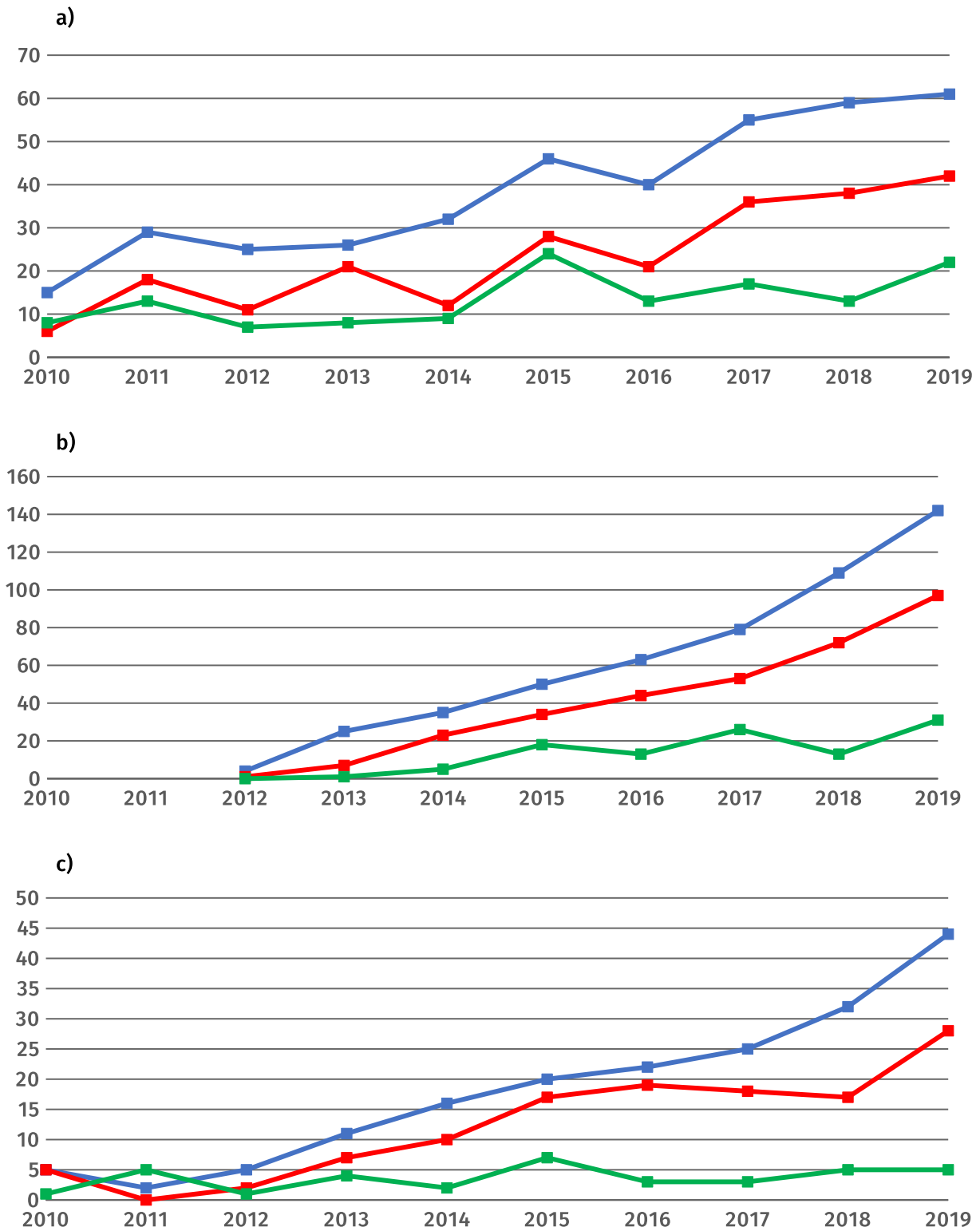


Figure 1. The graphs show the manuscripts received (in blue), rejected (in red), and published (in green) by the Annals of the Brazilian Academy of Sciences (AABC) between 2010 and 2019 in (a) Biomedical, (b) Health and (c) Social Sciences.

by missing articles is Earth Sciences (MAI – 0.0714). Regarding the totality of papers published by the AABC, 17 articles out of the 300 published in 2018 were not considered in the JCR of 2019 (MAI – 0.0567), revealing that almost 6% of the publications were missing. Apparently, this problem is more common than one might suspect and needs to be examined in more depth. I hardly believe that only the AABC is being affected by this omission and the citation industry should be aware that MAI happens, can affect the metrics of a journal and, perhaps, even that of the authors (Kellner 2020b).

Another noteworthy outcome of the present study is the difference in citations regarding the JCR 2019. As widely known and accepted, the IF calculated for a journal is the ratio of the total citations in a given year of the citable articles published in the two previous years, to the number of citable articles published in those two years (e.g., McVeigh & Mann 2009). In the case of the AABC 2019 IF, JCR presented 377 + 305 citations of articles published in 2017 and 2018, respectively (cited during 2019), and 250 + 283 articles published in 2017 and 2018, respectively. This resulted in an IF of 1.280 (682/533). The 283 articles listed by JCR have received a total of 293 citations according to the JCR list, 12 less than the official number used (305). This difference might be due to the citations of editorials (five were published by the AABC in 2018, e.g., Andreote 2018) that were listed in the numerator while this kind of publication is not added to the number of published articles in the denominator. Based on this conclusion, the IF of the editorials published in 2018 is 2.400, proportionally higher than most articles published by this journal in 2018. Considering solely the citations in 2019 of articles published in 2017 divided by the citable articles published in 2017, the IF is 1.506 (377/250). The same calculation for the citable articles published in 2018 results in an IF of 1.078 (305/283) and, excluding the citations of the editorials, 1.035 (293/283). The higher citations in 2019 of articles published in 2017 (available for more time) than the ones published in 2018, renders the expectation that the impact of the 2018 articles in the future AABC 2020 IF will be higher than their influence on the AABC 2019 IF.

From the 10 scientific areas considered by the AABC, Physical Sciences lacked any publication during 2018. The reduced number of submissions to this journal regarding this scientific field has already raised concerns in the past (Kellner 2017). The lowest IF restricted to an area was Social Sciences, followed by Engineering and Mathematical Sciences (Table I). Agrarian and Biological Sciences, the two areas with most submission and papers published in 2018, had a low ACF, indicating that less than half of the articles published had any citation in 2019, pushing down the ACF (and other metrics) of the journal. The same is true for Health Sciences, causing apprehension since from the 1281 manuscripts submitted during 2018, 896 (69.95%) came from these three areas (Kellner 2020a, b, c), a tendency that is expected to continue.

The strongest positive impact on the AABC 2019 IF came from Chemical Sciences. This is expressed in all metrics, including the ACF (0.7073), showing that two thirds of the published papers were cited at least once in 2019. One explanation for this performance are two special issues with 15 (Cavaleiro 2018) and 16 (Crespilho 2018) articles, respectively. They include the three most cited papers of this field during 2019 (Table I).

Earth Sciences is the second area with the greatest positive impact for the AABC metrics. The ACF calculated for this field shows that 6 out of 10 papers published in 2018 were cited at least once in the following year. This area also produced the most cited paper of the AABC during 2019 (see Kellner 2020c for comments), showing the influence of highly cited publications to the metrics of journals (or specific scientific fields), for all those with modest IFs and ACFs (Table I).

Although preliminary, this series of brief analyzes shows the great variation between the potential and the impact of distinct scientific fields in the metrics of a broad multidisciplinary journal such as the AABC, what can be considered as expected (Table I). What is surprising and a matter of concern is the fact that over half of the articles published in 2018 were not cited in the following year (ACF 0.4735). If only the cited papers are taken into consideration, the AABC showed a better performance, which is expressed by RAIF (2.187), indicating a potential for greater impact if manuscripts are better selected with more general than local impact. Contributions in certain scientific areas, such as Biomedical and Health Sciences, which tend to have much higher citation rates in other journals, are quite low, showing that the AABC has a long way to go in order to attract studies with a greater citation potential in these particular fields. It is also important to stress that the articles published in 2018 may not have been in the “citation industry market” long enough and that they will provide greater contributions to the journal’s metrics in 2019, as the papers published in 2017 did for the AABC 2019 IF.

REFERENCES

AMARAL OB. 2018. All publishers are predatory – some are bigger than others. *An Acad Bras Cienc* 90: 1643-1647.

ANDREOTE FD. 2018. How to live and do science in a changing world. *An Acad Bras Cienc* 90: 1-2. DOI 10.1590/0001-37652017901.

BUTLER D. 2013. Investigating journals: The dark side of publishing. *Nature* 495: 433-435.

CAVALEIRO JAS. 2018. Chemistry and Health: Past, Present and Future. *An Acad Bras Cienc* 90: 991-992. DOI 10.1590/0001-3765201890S2.

CRESPILHO FN. 2018. Commemorative Volume on the Centenary of the Brazilian Academy of Sciences: “Brazil: Frontiers of Chemical Sciences”. *An Acad Bras Cienc* 90: 591-592. DOI 10.1590/0001-3765201890S1.

HICKS D, WOUTERS P, WALTMAN L, DE RIJCKE S & RAFOLS I. 2015. Bibliometrics: The Leiden Manifesto for research metrics. *Nature* 520: 429-431. pmid:25903611.

IOANNIDIS JPA, BAAS J, KLAVANS R & BOYACK KW. 2019. A standardized citation metrics author database annotated for scientific field. *PLoS Biol* 17(8): e3000384. pmid:31404057.

KELLNER AWA. 2017. The Qualis system: a perspective from a multidisciplinary journal. *An Acad Bras Cienc* 89: 1339-1342. DOI 10.1590/0001-37652017893.

KELLNER AWA. 2020a. Development of Agrarian Sciences at the AABC with comments on impact and performance evaluations. *An Acad Bras Cienc* 92: e202092S1. DOI 10.1590/0001-3765202092S1.

KELLNER AWA. 2020b. Development of Biological Sciences at the AABC. *An Acad Bras Cienc* 92: e202092S2. DOI 10.1590/0001-3765202092S2.

KELLNER AWA. 2020c. Impact and performances of different scientific fields at the AABC. *An Acad Bras Cienc* 92: e2020923. DOI 10.1590/0001-37652020923.

KELLNER AWA & AZEVEDO RA. 2013. A closer look at the Impact Factor (JCR 2012): problems, concerns and actions needed. *An Acad Bras Cienc* 85: 859-862. DOI 10.1590/S0001-376520130003000001.

MCVEIGH ME & Mann SJ. 2009. The Journal Impact Factor Denominator. *JAMA* 302: 1107-1109. DOI 10.1001/jama.2009.1301.

How to cite

KELLNER AWA. 2020. A brief summary of the impact and performance of different scientific fields at the AABC. *An Acad Bras Cienc* 92: e2020924. DOI 10.1590/0001-37652020924.

ALEXANDER W.A. KELLNER

<https://orcid.org/0000-0001-7174-9447>

Laboratório de Sistemática e Tafonomia de Vertebrados Fósseis, Departamento de Geologia e Paleontologia do Museu Nacional/UFRJ, Quinta da Boa Vista, s/n, São Cristóvão, 20940-040 Rio de Janeiro, RJ, Brazil

E-mail: kellner@mn.ufrj.br

