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## Do Open Access Dental Articles Enjoy Higher Altmetric Attention Scores, Twitter, Facebook, News, Wikipedia, Blog mentions, Mendeley Readers and Citations?

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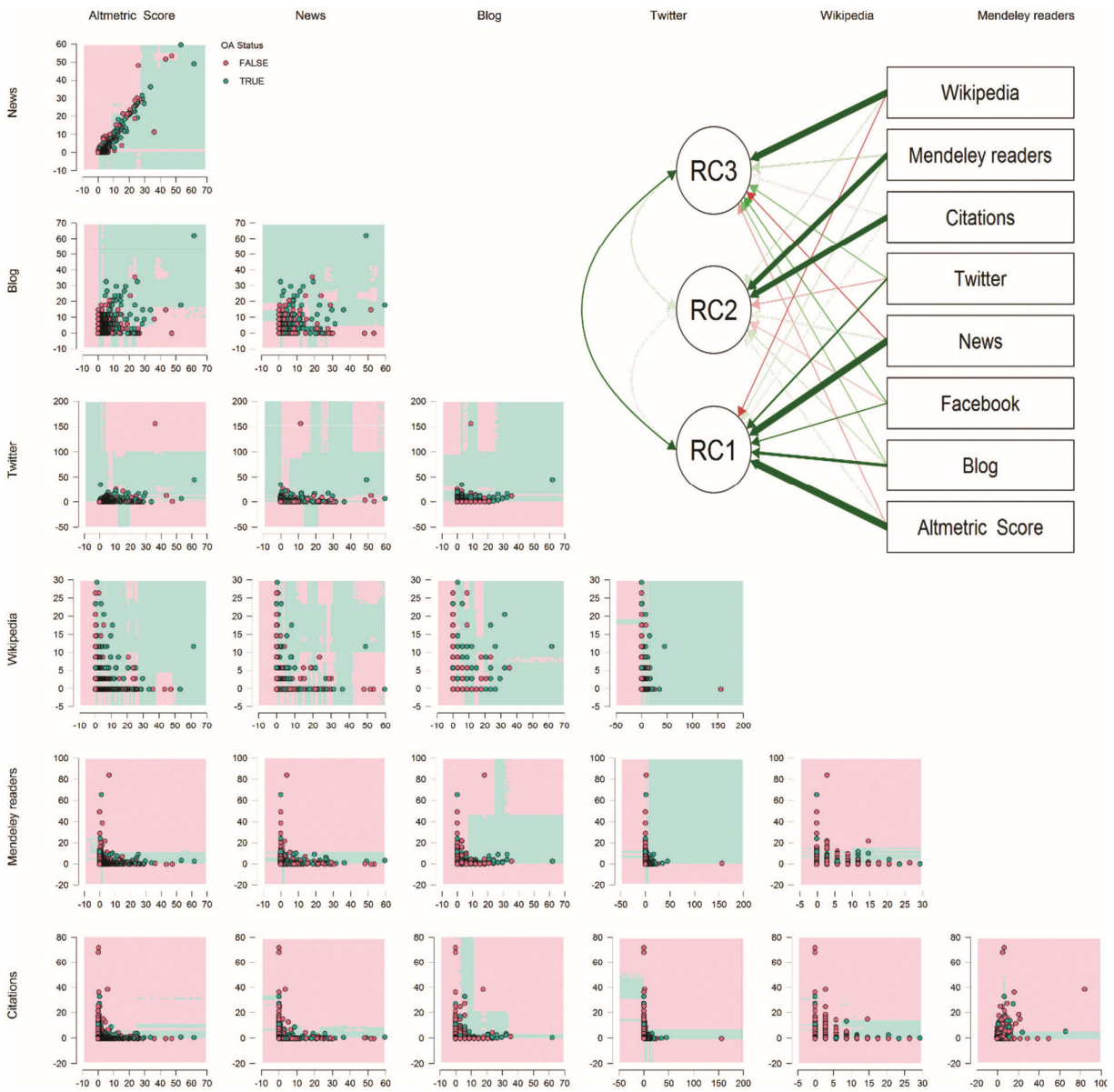
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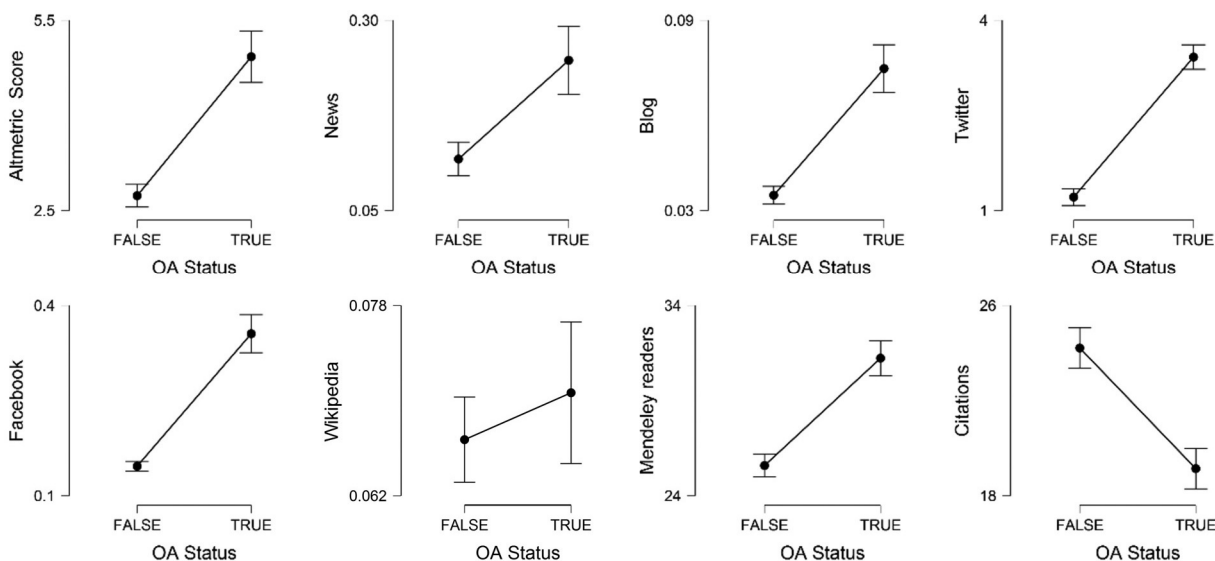
# Do Open Access Dental Articles Enjoy Higher Altmetric Attention Scores, Twitter, Facebook, News, Wikipedia, Blog mentions, Mendeley Readers and Citations?

In order to access articles published in conventional (non-open access) journals, scientists must utilize tools such as subscriptions, site licenses or pay-

per-view charges. In contrast, open access articles can be accessed without financial, legal or technical barriers.



**Figure 1:** Contour-based decision boundary matrix created by means of random forests model (a machine learning algorithm). Each scatter plot contains the data-points belonging to different classes (open access and non-open access) and colored contours depicting the predicted classes. Path diagram on the right side showed results of principal component analysis. The components were selected such that they clarify most of the variance in the original dataset.



**Figure 2:** Comparison between means of altmetric attention score, Twitter, Facebook, News, Wikipedia, Blog mentions, Mendeley readers and citations of open access and non-open access articles.

A large-scale study estimated that at least 28% of the academic literature is open access (19 million in total) and that this percentage is growing.<sup>[1]</sup> A recent survey showed an open access rate in field of dentistry at 45.8%.<sup>[2]</sup> It has been demonstrated that open access articles had 8% to 40% higher citations compared to non-open access articles; this has been termed, “open access citation advantage”.<sup>[3-5]</sup>

On January 24, 2020, the Altmetric database (Altmetric LLP, London, UK) was searched with the field of research code “1105 DENTISTRY”. 30,950 non-open access and 15,001 open access articles found and analyzed utilizing R 3.6.1 software (R Foundation for Statistical Computing, Vienna, Austria). Primary analyses were calculated by decision boundary matrix and principal component analysis [see Figure 1]. Levene’s test was significant ( $P < 0.05$ ), suggesting a violation of the assumption of equal variances. Hence, Welch’s t-test (unequal variances t-test) was employed. Open access articles had significantly higher Altmetric attention scores, Twitter, Facebook, News, Blog mentions, and Mendeley readers ( $P < 0.001$ ). No significant differences were observed comparing non-open access and open access articles for number of Wikipedia mentions ( $P = 0.266$ ). Non-open access articles had significantly higher citation rates (Source of citations obtained from the “Dimensions” database) ( $P < 0.001$ ) [see Figure 2].

Readers should note the limitations of this study. Only open access articles from open access journals (known as “gold open access”) and open access articles under an open license in toll-access journals (termed “hybrid open access”) were analyzed. Free copy and self-archived articles from open access and institutional repositories (referred to as “green open access”) were excluded in this investigation. This analysis incorporated dental articles from dental-specific and non-dental journals. For example, an open access article entitled, “Sugar industry influence on the scientific agenda of the National Institute of Dental Research’s 1971

National Caries Program: a historical analysis of internal documents”, published in PLoS Medicine was included in this study and had these outcomes: a 1,211 Altmetric attention score; 447 Twitter, 77 Facebook, 99 News, 4 Wikipedia, 17 Blog mentions; 159 Mendeley readers; and 54 citations.

In this large-scale study ( $n = 45,951$ ), the open access rate was 32.6%, which was lower than previous reports in the field of dentistry.<sup>[2]</sup> In contrast with previous studies,<sup>[3-5]</sup> we did not observe any open access citation advantage in the field of dentistry, and non-open access articles received significantly more citations. Yet, open access articles received significantly more online attention, except among Wikipedia articles.

In conclusion, open access dental articles receive: higher Altmetric attention scores; more mentions in Twitter, Facebook, News, and Blogs; more Mendeley readers; similar Wikipedia mentions; and lower citations in research publications. The patterns in which publications are accessed and referenced in the field of dentistry should continue to be monitored in both social media and scientific outlets. Dissemination of and access to dental-related scientific publications will continue to be an important topic in the future.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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