Relative prolixity in journals with different citation impact values: an evidence-based scientific writing assessment [version 1; peer review: awaiting peer review]

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Abstract

Background: Scientific writing guidelines recommend that a scientific text should be straightforward, without prolixity, and informative, without obscurity. However, the extent to which researchers follow these recommendations is unknown. Considering that the most cited journals provide more detailed instructions for authors, we aimed to investigate the degree of relative prolixity (i.e., length versus amount of information) among journals with different citation impact scores.

Methods: We analyzed journals whose articles follow the classic Introduction, Method, Results, and Discussion structure, written in English and with a CiteScore value ≥ 0.01 classified in the ‘Pharmaceutical Science’ area. Relative prolixity was calculated as the ratio between the number of characters and the number of citations contained in the introductory section of original articles. Additionally, we collected the number of paragraphs and words.

Results: The number of characters, words and citations in the Introduction section were significantly higher in the journals with higher CiteScore values. The median number of paragraphs in the Introduction was not affected by the citation impact of the journals. The degree of relative prolixity in the Introduction section of the articles was negatively correlated with the CiteScore values.

Conclusions: Articles published in journals with higher CiteScore values have lower degrees of relative prolixity (i.e., shorter texts to transmit a certain amount of information) and obscurity.

Keywords

Academic writing, Bibliometrics, Health, Impact factor, Scientometrics
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Introduction
A scientific text should be straightforward, without prolixity (Matthews & Matthews, 2014), and informative, without obscurity (Annesley, 2010a; Hirst et al., 2015). However, the extent to which researchers follow these recommendations is unknown. Considering that the most cited journals provide more detailed instructions for authors (Gasparyan et al., 2017), we hypothesized that articles published in such journals would be less prolix and more informative than those published in journals with fewer citations. Therefore, the objective of this study was to investigate the degree of relative prolixity (i.e., length versus amount of information) among journals with different CiteScore™.

Methods
Experimental design
To verify the degree of relative prolixity of original articles among journals with different citation impact scores, we chose to analyze journals of a specific area whose publications had their quality recently assessed – ‘Pharmaceutical Science’ area (indexed in the Scopus database) (Bohannon, 2013; Xia et al., 2015). We evaluated 101 journals (from 305) whose articles follow the classic Introduction, Method, Results, and Discussion (IMRAD) structure, written in English and with a CiteScore value ≥ 0.01.

The degree of relative prolixity was calculated as the ratio between the number of characters, which increase prolixity (Hirst et al., 2015), and the number of citations to any reference, which make the text more informative (Annesley, 2010b; Katz, 2009). Additionally, we collected the number of paragraphs and words. These analyses were done in the Introduction because this is the only section for which scientific writing literature recommends a length limit. To count the number of characters (including spaces), words, paragraphs and citations, the entire body of text of the Introduction section of each article was copied and pasted into Microsoft Office Word 2010 (Microsoft Corporation, Redmond, WA, USA). Each journal was evaluated using the median of the last three published articles in 2018.

Data analysis
Journals were grouped into quartiles of distribution based on their CiteScore values (Fernandez-Llimos, 2018). Differences between groups were assessed using the Kruskal-Wallis test and the correlation between the journals’ CiteScore and the degree of relative prolixity was assessed by the Spearman’s rank correlation test using SPSS software version 21 (IBM, Armonk, NY, USA). For all analyses, p values below 0.05 were considered statistically significant. Data are presented as mean ± standard error of the mean.

Results
The mean CiteScore values of the ‘Pharmaceutical Science’ journals divided into the four quartiles were 0.34, 1.37, 2.40 and 4.14, respectively. The median number of paragraphs in the Introduction of articles did not differ significantly between quartiles and ranged from 3.92 to 4.84 (p = 0.102; Figure 1a). Both the number of characters (including spaces) and citations (21, on average) in the Introduction were significantly higher in the journals with the highest CiteScore (p < 0.001; Figure 1b and c). The number of words in the Introduction gradually increased from the first to the fourth quartile (p < 0.001), whose average number was 442.69, 512.24, 591.00, and 721.60 words. No differences were detected between the first and second, and second and third quartiles (p > 0.05).

The degree of relative prolixity in the Introduction of the articles presented a negative correlation with the CiteScore value of the journals (p = 0.017; Figure 2).

Discussion
This study showed that the articles published in pharmaceutical science journals with higher values of CiteScore have an Introduction with a lower degree of relative prolixity and more characters, words, and citations. A low degree of relative prolixity matches the consensual recommendation that the
Introduction should be as short as possible (Annesley, 2010b; Armağan, 2013; Katz, 2009; Liumbruno et al., 2013; Matthews & Matthews, 2014). One hypothesis to explain our results is that authors who publish in journals with higher citation impact would have better writing skills. In fact, people with less cognitive ability use more words to express information (Saling et al., 2012; Saling et al., 2016). Another hypothesis is that articles that cite more references would simply be more cited, which in fact occurs (consequently increasing CiteScore values) (Fox et al., 2016; Gargouri et al., 2010).

The higher number of references in articles from journals with higher CiteScore indicates that such articles refer to more experimental findings to support their statements. This agrees with the recommendation that a scientific text should cite the most relevant findings that directly relate to the particular scope of the study (Cals & Kotz, 2013; Seals & Tanaka, 2000; Thrower, 2008), i.e., the “closest information available in the scientific literature” (Katz, 2009). However, the citations may refer to sources that should be avoided, such as books, review articles, and papers whose degree of proximity to the original findings is low (Bavdekar, 2015; Katz, 2009). The average number of words in the Introduction found here (442.69–721.60) was higher than the recommendation of 250–300 words (Bahadoran et al., 2018; Kallestinova, 2011) and disagrees with the consensus that the Introduction should be short (Kallestinova, 2011; Liumbruno et al., 2013; Matthews & Matthews, 2014; Seals & Tanaka, 2000). Furthermore, the number of paragraphs in the Introduction found in the present study (3.92–4.84) was also higher than the recommended number of up to three paragraphs (Annesley, 2010b; Bahadoran et al., 2018; Katz, 2009; Liumbruno et al., 2013; Matthews & Matthews, 2014; Thrower, 2008; Vitse & Poland, 2017), which indicates that many authors are not aware of or ignore this recommendation.

In conclusion, articles in the pharmaceutical sciences journals with higher CiteScore values show lower degrees of relative prolixity (i.e., shorter texts to transmit a certain amount of information) and obscurity.

Data availability
Underlying data

This project contains the following underlying data:

- Nascimento et al. Relative prolixity Dataset 1 CC0.xlsx (Dataset containing the number of characters (including spaces), paragraphs, and citations in the Introduction of the analyzed papers)

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

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