

STANDARDS OF SELF-CITATION IN HIGH IMPACT ARTICLES OF NATURE JOURNAL

PADRÕES DA AUTOCITAÇÃO EM ARTIGOS DE ALTO IMPACTO DA REVISTA NATURE

ESTÁNDARES DE AUTOCITACIÓN EN ARTÍCULOS DE ALTO IMPACTO DE LA REVISTA NATURE

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ABSTRACT: This investigation aims to understand self-citation patterns in scientific articles with a high impact factor from the journal *Nature*. The research is qualitative and the discussions are supported by the socio-cultural perspective that includes writing as a contextually situated literacy practice. From surveys carried out at *Google Scholar* database, we selected for analysis the four most cited articles in the journal *Nature*. From the analysis, three occurrences are recurrent in these articles under analysis: the high rate of citation, self-citation, and co-authorship. As for self-citation, we analyzed the context of publication of these studies, issues related to legitimacy, power and co-authorship relationships that mark academic-scientific writing. The self-citation patterns indicate a heterogeneous focus on the writing of the articles in this journal, which marks conventions in this area of knowledge, power relations manifested in partnerships between researchers, which implies legitimacy in the scientific community of the publications mentioned.

KEYWORDS: Academic-scientific writing. Literacy practices. Self-citation. *Nature* journal.

RESUMO: *Este trabalho tem por objetivo compreender padrões da autocitação em artigos científicos de alto fator de impacto da revista Nature. A pesquisa é qualitativa e as discussões são sustentadas pela perspectiva sociocultural que compreende a escrita como prática de letramento situada contextualmente. A partir de levantamentos realizados no Google Scholar, selecionamos para análise os quatro artigos mais citados no periódico Nature. A partir das análises, três ocorrências são recorrentes nesses artigos em análise: o alto índice de citação,*

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autocitação e coautoria. Quanto à autocitação, analisamos o contexto de publicação desses estudos, questões relacionadas à legitimidade, às relações de poder e de coautoria que marcam a escrita acadêmico-científica. Os padrões de autocitação indicam um enfoque heterogêneo na escrita dos artigos desta revista, o qual marca convenções nesta área do conhecimento, relações de poder manifestadas nas parcerias entre pesquisadores, o que implica legitimidade na comunidade científica das publicações referidas.

PALAVRAS-CHAVE: *Escrita acadêmico-científica. Práticas de letramentos. Autocitação. Nature.*

RESUMEN: *Esta investigación tiene como objetivo comprender los patrones de autocitación en artículos científicos de alto impacto de la revista Nature. La investigación es cualitativa y las discusiones están respaldadas por la perspectiva sociocultural que incluye la escritura como una práctica de literacidad contextualizada. De las encuestas realizadas en Google Scholar, seleccionamos para su análisis los cuatro artículos más citados de la revista Nature. Del análisis, tres ocurrencias son recurrentes en estos artículos bajo análisis: el alta tasa de citación, autocitación y coautoría. En cuanto a la autocitación, analizamos el contexto de publicación de estos estudios, cuestiones relacionadas con la legitimidad, el poder y las relaciones de coautoría que marcan la escritura académico-científica. Los patrones de autocitación indican un enfoque heterogéneo en la redacción de los artículos de esta revista, lo que marca convenciones en esta área del conocimiento, relaciones de poder manifestadas en alianzas entre investigadores, lo que implica legitimidad en la comunidad científica de las publicaciones mencionadas.*

PALABRAS CLAVE: *Escritura académico-científica. Prácticas de literacidad. Autocitación. Nature.*

Introduction

Academic-scientific writing in articles with a high citation index, from *Nature* Journal, is the focus of attention in this article. Specifically, self-citation patterns in these articles guide us in the discussion of the regularities that emerge when dealing with this occurrence, with the support of a social and discursive approach (LEA; STREET, 1998, CORRÊA, 2004; BOCH; GROSSMAN, 2002; 2015). In this sense, we consider it relevant to highlight that, throughout this article, we chose to use the term academic-scientific writing to characterize the way writing is conceived by us in this study. This formulation is in accordance with the model of academic literacy, proposed by Lea and Street (1998) who, instead of engaging in debates about the valuation of writing, proposed to conceptualize, in the epistemological plane, writing in academic-scientific contexts, which it is related to the production of meaning, identity, power and authority and puts, in the foreground, the institutional nature of

what counts as knowledge in any academic-scientific context (LEA; STREET; LILLIS, 2015).

The option to use the term academic-scientific writing is also supported by Assis (2014), when mentioning that the forms *écrit scientifique*, *écrit universitaire*, *écrit de recherche*, in French, and academic writing or scientific writing, in English, are common expressions about the type of practice used in our discussion. We are aware that there are differences between the academic and scientific writing forms, established mainly by a hierarchical organization, in relation to the discursive practices of writing, in which, in one pole there is the recognized researcher and, in another, the researcher in formation. However, in Brazil, although the terms scientific writing and university writing are adopted, the term academic-scientific writing is more frequent (ASSIS, 2014).

Considering the focus around literacy practices (LEA; STREET, 1998), which support the contextualization of the writing and scientific publication of articles in the *Nature Journal*, we oppose the myth of the homogeneity of the discursive genre scientific article, which relates to approaches commonly performed by manuals and by academic writing standards (SILVA; RODRIGUES, 2019). Our affiliation finds place in the constitutive heterogeneity of writing (CORRÊA, 2004), typical of scientific disciplines and communities (BOCH; GROSSMAN, 2015).

For the researcher, whether a beginner or an expert, it is a requirement, according to Hyland (2005) and Assis, Bailly and Corrêa (2017), to commit to writing and dissemination practices in the scientific community. More specifically in relation to the demands of the norms in these writing practices, one point in particular is the reference to the voice of the other, as a way of engaging with the scientific knowledge in circulation in the specific area of knowledge.

The other's discourse is materialized, explicitly in the text, from the citations, which contribute for the researcher to support and legitimize his positions. According to Boch and Grossmann (2015, p. 296, our translation), when the quote “is included in a self-citation system, it marks the writer's willingness to enroll in a continuity of thought, in the same way valuing, in the passage, countless works already performed”. Thus, it can be said that there are discursive patterns around self-citation. Hyland (2003), in a work on academic-scientific writing, approaches the use of self-quotation, relating it to self-mention. In this case, in addition to making self-reference to works already related, the author of a text exposes, linguistically, from the use of the first person of the speech (plural or singular), who is a researcher/author of the works cited.

In addition to the elements presented so far around self-citation, related to it, there are also other relevant aspects, such as the impact factor and the h index, which help in understanding this occurrence in high impact articles. According to Barata (2010, p. 103, our translation), the impact factor “indicates the average number of citations that articles from certain journals receive in a given year. This index has served to guide the quality of scientific publications and the choice of journals to which authors want to submit their work”. However, in some cases, the impact factor may be related to several interests in addition to scientific quality (PINTO; ANDRADE, 1999), such as differences in the impact of publications between areas of knowledge and differences between beginning and expert researchers.

The h-index was developed in 2005 by Jorge E. Hirsch, from the University of California (OLIVEIRA *et al.*, 2015), and assesses scientific production and measures the relevance of publications. This index is one of the prominent indicators in the scientific literature, which can integrate the calculation of the impact factor. It is a robust evaluative parameter, since it considers aspects related to the production of articles and the impact of the number of citations simultaneously (SILVA; GRÁCIO, 2017). In addition, “several databases present the calculation of this indicator, since it is used both in the evaluation of the behavior of researchers' scientific production and is also an evaluative criterion in several funding agencies” (SILVA; GRÁCIO, 2017, p. 199, our translation). Researchers, articles and journals are evaluated by their h index in several databases, such as the Web of Science, Scopus, Scielo and Google Scholar.

A British multidisciplinary scientific journal with a high impact factor and a high h index is *Nature*. Launched in 1869, it plays an important role in the circulation of scientific information for the international academy, as well as having great visibility with the publication of its articles in the media around the world (BARATA, 2010). In this sense, *Nature* is one of the oldest, most traditional journals active in the scientific world (BARATA, 2010; KRASILCHIK; SILVA; SILVA, 2015). For the authors, this weekly journal has an understandable language, peer review, which gives credibility and is based on an editorial board with renowned researchers in the scientific community. In this way, it gives great value to both specialized and non-specialized media, as well as presenting meaningful and legitimate information, offering visibility and prestige to authors who publish in the journal.

Nature is based on several areas of knowledge, especially those called Hard Sciences. For Barata (2010, p. 100, our translation), “the term hard science refers to areas of knowledge based on empirical observation and investigations carried out from the so-called scientific

method, physics, chemistry, mathematics and biological sciences”. The Hard Sciences carry out research relevant to scientific progress, with a high impact factor and, thus, have guided the demands of academic-scientific production in other areas of knowledge, in relation to research funding and its legitimacy, for example (BARATA, 2010).

In this sense, understanding the ways of writing in the Hard Sciences can also help in understanding the dynamics of scientific production in high impact journals. From these delimitations, the objective⁵ of this study is to understand self-citation patterns in scientific articles with a high impact factor from the journal *Nature*. In line with the explanations presented so far about the occurrence of self-citation in articles of high impact, in the area of Hard Sciences, below, we present the main methodological choices that guided this study.

Methodological path

This research, approved by the ethics committee under number 28740820.0.0000.5370, is characterized as qualitative. In this regard, the data around self-citation, in articles in the journal *Nature*, are analyzed inductively and the meanings under discussion are extremely important to the study (BOGDAN; BIKLEN, 1994). The articles selected for the present study come from a database with free access to the public.

The databases, such as the *Web of Science*, *Scientific Electronic Library Online - Scielo*, *Scopus* and *Google Scholar*, are characterized by important mechanisms for organizing, classifying and conditioning the circulation of scientific journals from different areas of knowledge (CALDERÓN; MARTI-NOGUEIRA; FERNANDEZ-GODENZI, 2018). To start the survey of the research corpus, the base selected for this investigation was Google Scholar, as it has metrics that identify the main journals in all areas, such as the h index. In addition, Google Scholar, being a free access platform, is practical to handle, presents information about the impact factor of journals, articles and authors, making available, for example, articles in order of the highest number of citations, unlike the other platforms mentioned.

⁵ This objective is part of two interinstitutional projects in progress, of which we integrate the group of researchers: “*Escrita acadêmica/científica: das formas de presença do autor, do outro, das áreas de conhecimento e seus domínios disciplinares*” (Academic/scientific writing: the forms of presence of the author, the other, the areas of knowledge and their disciplinary domains) (CNPQ/Universal), led by prof. Dr. Juliana A. Assis (PUC-MG); “Authorship in Different Fields of Knowledge” (CAPES PRINT UNESP), coordinated by Prof. Dr. Fabiana C. Komesu, UNESP- São José do Rio Preto.

Nature was selected for analysis because it is the most cited journal among all areas of knowledge, on Google Scholar, and also because it is the most cited journal within Hard Sciences, taking into account its h index, as shown in Figure 1.

Figure 1 – Principais publicações da base de dados *Google Scholar*

Principais publicações		
Categorias ▾		inglês ▾
Publicação	Índice h5	Mediana h5
1. Nature	368	546
2. The New England Journal of Medicine	352	603
3. Science	338	511
4. The Lancet	282	464

Source: Research data (2020)

At Google Scholar, in addition to the first general position among the journals, as shown in Figure 1, *Nature* also has the first position in the Life Sciences & Earth Sciences and Life Sciences & Earth Sciences (general) categories. In addition, the h5 index is 368 and the median is 546. The h5 index is the h index of articles published in the past five years. This is the largest number h of a publication, in which h articles published from 2014 to 2018 have been cited at least h times each. The median h5 of a publication, on the other hand, consists of the average number of citations for the articles that make up its h5 index (GOOGLE SCHOLAR, 2020).

In the Google Scholar database, there is a decreasing classification of the most cited articles within the journal (Chart 1), in which the articles with the greatest impact can be identified, based on the h index. Thus, in a research carried out in February 2020, the four most cited articles in the journal *Nature* were selected for the present investigation.

Chart 1 – Classification of the four most cited articles in *Nature* in the Google Scholar database

Title / Author	Cited	Year
A1 - Deep learning. Y LeCun, Y Bengio, G Hinton. <i>Nature</i> 521 (7553), 436-444.	16750	2015
A2 - Human-level control through deep reinforcement learning. V Mnih, K Kavukcuoglu, D Silver, AA Rusu, J Veness, MG Bellemare, ... <i>Nature</i> 518 (7540), 529-533.	6101	2015

A3 - Mastering the game of Go with deep neural networks and tree search. D Silver, A Huang, CJ Maddison, A Guez, L Sifre, J Schrittwieser, ... <i>Nature</i> 529 (7587), 484-489.	5212	2016
A4 - Analysis of protein-coding genetic variation in 60,706 humans. M Lek, KJ Karczewski, EV Minikel, KE Samocha, E Banks, T Fennell, ... <i>Nature</i> 536 (7616), 285-291.	4530	2016

Source: *Google Scholar* (2020)

After the selection of the articles, we carried out the analysis around the following aspects: i) the context of publication of these studies, ii) issues related to the legitimacy and power relationships that permeate academic-scientific writing and iii) specificities around self-citation. These elements are understood and discussed in detail in the section that follows.

Results and discussion

The perspective around academic-scientific writing, understood as a literacy practice, provides support so that we can understand how the dynamics of visibility that academic-scientific publications receive in journals with a high impact factor work. In this sense, we highlight three occurrences in the articles under analysis, from the journal *Nature*: the high rate of citation, self-citation and co-authorship. Another aspect that deserves attention is the use, within the journal, of the Vancouver standards, typically used by Hard Sciences journals, especially because they bring a configuration that is captured by the large international databases, such as the Web of Science and Scopus (CALDERÓN; MARTI-NOGUEIRA; FERNANDEZ-GODENZI, 2018). It is also worth noting the fact that the methodological section of the articles under analysis is presented after the conclusions and references, a specific feature of this journal.

Our findings are supported by discussions by Barata (2010), which defines *Nature* as a high impact factor journal recognized as one of the most important scientific journals in the world, being responsible for the dissemination of the most relevant and unprecedented scientific discoveries. The author adds that the researchers who submit their work to this journal understand the relevance of their research, and that, in this way, in *Nature* they will have great visibility and dissemination.

In this sense, power relations necessarily regulate what counts as knowledge in this scientific journal (STREET; LEA; LILLIS, 2015). The positioning of these three scholars, representatives of literacy studies, is in line with what Barata (2010) postulates, when arguing that, for publication in *Nature*, several aspects are relevant, such as: great scientific rigor in

the development of the work, reframing the format at the suggestion of the editors, language adapted and adjusted by specialized editors, prior contact with the editors before the submission of the work, prior knowledge of the editors regarding the work of the authors, partnerships with foreign researchers and multidisciplinary works. In this sense, such aspects mentioned represent evidence of power relationships in literacy practices with academic-scientific writing (STREET; LEA; LILLIS, 2015).

Since the journal *Nature* publishes articles in the English language, we give voice to authors such as Emiliozzi (2018) and Hyland (2019), who problematize this occurrence. In line with the authors, Barata (2010) indicates that language and socioeconomic conditions present barriers for researchers from countries of non-English origin, reflecting that “[...] authors and articles from peripheral or poor countries receive a differentiated treatment, namely, more rigorous, in relation to countries in the Northern Hemisphere, rich or developed” (BARATA, 2010, p. 174, our translation). These discussions support our data while the articles analyzed by us are, for the most part, by authors who have English as their mother tongue and also because they were produced, in large part, in developed country contexts.

Another point that deserves to be highlighted in this study is the fact that an analysis based on the assumptions of literacy practices, among them relations of power, context, production conditions, ideologies, identities and authority, allow us to analyze the meanings of the presence of the other in articles. This reflection is in line with what Gee (2000) discusses, when mentioning that the insertion of a subject in different literacy practices, in this case, with academic-scientific writing, requires his socialization with what Gee (2001) classifies as Discourses. In the Discourses are inserted the social languages that assume relevance and meaning through them (AUTHOR). In this sense, Discourses involve more than language, integrating

[...] ways of speaking, listening, writing, reading, acting, interacting, believing, valuing, feeling and using various objects, symbols, images, tools and technologies, in order to activate meaningful identities and activities, socially situated (GEE, 2001, p. 719, our translation).

According to Gee (2001), the main characteristic of Discourses is that they are ideological, as they involve a set of values, points of view on the relationship between people, on the distribution of social goods and indicate who are the insiders in certain literacy practices. Based on these reflections, the authors that make up the corpus of the present study can be considered insiders in literacy practices that involve the academic-scientific writing

and publication path. In this way, the use of self-citation was one of the elements that emerged from these practices, being also part of the dynamics used by them in engaging with the Scientific Discourse.

Chart 2, below, shows the organization of the data of the analyzed articles, with emphasis on the number of times that were cited by other authors, number of authors, references, and self-citations by references. It should be noted that, in the articles analyzed, each self-citation was counted only once, regardless of the number of occurrences in the text.

Chart 2 – Data of the articles in relation to the number of times that it was cited by other authors, number of authors, references and self-citations per reference

Article	Number of times cited by other authors	Number of authors	Number of references	Number of self-citations per reference
A1	16750	3	103	55 (53,39%)
A2	6101	19	33	7 (21,21%)
A3	5212	20	61	12 (19,67%)
A4	4530	42	37	17 (45,94%)

Source: devised by the authors (2020)

A1 presents a specific pattern when compared to the other articles, both in relation to the number of citations (16,750), which is up to three times greater than the subsequent ones, and in the number of authors, since it presents a reduced proportion compared to the others. In addition, A1 is composed of the highest self-citation index, which represents around 53% of the number of references in the article. A1, the only of bibliographic review nature among the analyzed articles, has its authors cited in other publications that make up the corpus of analysis. These specific characteristics of A1 may be related to the great impact of this publication or to the authors' own credibility.

Although A1 was written by only three authors, the references in the self-citations indicate that they have a large collaborative network of academic and scientific studies and productions with other authors. This is confirmed by the number of references shown in Chart 2, where it can be seen that A1 has 103 references, representing approximately twice as much in relation to A3 and approximately triple in relation to A2 and A4. In contrast, articles A2, A3 and A4 have a high number of authors, 19, 20 and 42, respectively.

The high number of researchers who produce in co-authorship is a regularity that has been establishing itself in the Hard Sciences, meeting the social demands of the areas and

publication, such as internationalization. In line with this positioning, Barata (2010, p. 119, our translation) mentions that an important point in the construction of scientific knowledge in *Nature* “is the increase in articles written in co-authorship, which are increasingly common in areas where international cooperation and consortia are present (genetics, climatology, and physics, are the most popular areas)”. The author reflects that co-authorship gained strength after the Second World War, in the period of the so-called big science, due to the large investments in science and technology, as well as the complexity and competitiveness of the experiments, requiring multidisciplinary teams from different institutions and nationalities. However, the author points out that,

although commendable and justifiable, the articles signed in co-authorship (many easily reach a total of several dozen authors, reaching a few hundred) do not make clear the contributions made by each one and raise the question about the limits imposed by a demand for increasing productivity versus the actual individual contribution. It is a fact that hierarchies existing in laboratories, research groups and even departments raise the inclusion of authors merely for their role as scientific authority, or others for their academic status - such as scientists from developed countries who are invited to elaborate a given article already thinking facilitation of the acceptance process in high impact journals. Current scientometric indices, however, do not discriminate articles with one or many authors (BARATA, 2010, p. 120, our translation).

These discussions reflect important aspects present in our data, since the articles under analysis have many co-authors, however, it is not possible to identify and measure the effective participation of all authors in each work. In this sense, Barata (2010), from dialogues with authors from *Nature*, found that the credibility of publishing in this journal exceeds the impact factor and the number of citations that the articles receive, having a greater relation to the prominence in the social and professional scope. The author adds that publishing in *Nature* “works as an entry into an international network with legitimacy to make the author and his research more visible so that he can have access to the international and, often, national academy, facilitated” (BARATA; 2010, p. 184, our translation). The issue of legitimacy in the academic-scientific environment, discussed earlier, dialogues with Hyland (2003, p. 251, our translation), when he states that “the use of self-quotation is one of the most important ways that authors seek to achieve credibility in the scientific environment”. We believe, therefore, that achieving this credibility requires the researcher to be involved and understand the so-called dominant literacy practices (STREET, 1995; BARTON; HAMILTON, 2000), present and disseminated in socially institutionalized contexts, such as the university.

As shown in Chart 2, the analyzed articles had a high rate of self-citations by reference, being A1 with 55/103 (53.39%), A2 with 7/33 (21.21%), A3 with 12/61 (19.67%) and A4 with 17/37 (45.94%). This pattern confirms the reflections made by Hyland (2003) on articles in the large area of Biological Sciences, a member of the Hard Sciences, which have a high number of self-citations, a pattern in the area itself. According to Hyland and Jiang (2018, p. 372, our translation), “authors may, therefore, have good reasons to cite their own work, as they can demonstrate research over an extended period with individual studies built on each other and referring to their previous work”. However, Hyland and Jiang (2018) mention that scientometric studies consider that self-citations can be used artificially, as a strategy to raise the h index or impact factor of the authors. Taking into account the specificities of the Hard Sciences, the data under analysis may indicate that self-citations have been used, in our corpus, not as a strategy, but as a way of disseminating research works that were developed following standards in the area. These discussions can be seen from Chart 3, which shows the use of self-citations according to each section of the analyzed articles:

Chart 3 – Use of self-citations by article section

	A1	A2	A3	A4
Abstract	0 (0,0%)	2 (11%)	0 (0,0%)	0 (0,0%)
Introduction	3 (4%)	2 (11%)	3 (15%)	4 (15%)
Theoretical Support	1 (1%)	1 (6%)	0 (0,0%)	0 (0,0%)
Results and discussion	57 (83%)	5 (28%)	5 (25%)	18 (67%)
Conclusions	8 (12%)	2 (11%)	1 (5%)	3 (11%)
Methods	Do not apply ⁶	6 (33%)	11 (55%)	2 (7%)

Source: devised by the authors (2020)

The Hard Sciences, according to Chart 3, present a pattern of distribution of self-citation by section of the article, being concentrated on results and discussions and methods. The sections of summary, introduction, theoretical support and conclusions have low rates of self-citation. The high occurrence of self-citation in certain sections may be related to the requirements of the scientific community, in which the authors are inserted (HYLAND, 2011). In this sense, in the course of academic-scientific writing there is a need to reference the discourse of the other, however, as the authors of the analyzed articles are experienced

⁶ As this is a bibliographic review article, the study does not have a methodological section.

researchers and have a consolidated research trajectory, there is also the need to reference studies carried out by them, which implies the use of self-quotation.

Therefore, from the analysis in relation to self-citations, there seems to be a need, on the part of the authors, to highlight the visibility of their participation in the development of self-cited research based on the use of self-mention. Thus, the self-mention is presented as a form of explicit presence of the authors in the text, based on the use of first person pronouns. Such finding can be observed to the detriment of occurrences of self-mention, within the self-citations, found in all the analyzed articles, as shown below:

*A1: “When the RNN is given the ability to focus its attention on a different location in the input image (middle and bottom; the lighter patches were given more attention) as it generates each word (bold), **we found**⁸⁶ that it exploits this to achieve better ‘translation’ of images into captions” (Discussion section).*

*A2: “**We tested** this agent on the challenging domain of classic Atari 2600 games¹²” (Introductory section).*

*A3: “For the first stage of the training pipeline, **we build** on prior work on predicting expert moves in the game of Go using supervised learning^{13, 21–24}” (Theoretical Reference).*

*A4: “**We adjusted** the standard GATK variant site filtering³⁸ to increase the number of singleton variants that pass this filter, while maintaining a singleton transmission rate of 50.1%, very near the expected 50%, within sequenced trios”. (Methodological section).*

A pattern that could be identified in our analyzes was that, although a high number of self-citations was observed, the self-mention index was relatively low in the articles. In addition, despite the manifestation of self-mentions in different sections of the analyzed articles, according to the excerpts above, the greatest recurrence of self-mentions occurred in the methodological section.

These considerations are well marked by Hyland (2003), when stating that in the Hard Sciences articles, specifically in Biological Sciences, when self-mention is made, it usually happens in the explanation of procedures, in the methodological sections. In a way, the dialogue woven between self-mention and self-quotation marks the participation and authorship in the referenced researches. This reflection also dialogues with Hyland (2011) when stating that self-mention plays a prominent role in the engagement between the positions of the authors and the scientific community. In this sense, “the explicit self-mention does not emphasize personal credibility through procedural skills but highlights the writer's unique role in building a plausible interpretation for a phenomenon” (HYLAND, 2003, p. 258, our translation). Therefore, as proposed in the objective of this article, another specificity that is established is the recurrence of self-mentions related to self-citations within the methodological procedures section.

Thus, according to discussions by Hyland (2003, p. 6, our translation), “although impersonality can be institutionally sanctified and self-citation disapproved, these conventions are constantly transgressed as writers are pressured to promote their arguments and themselves”. Thus, there is evidence that, despite rules and regulations and the discourse of neutrality and objectivity in academic-scientific writing, elements such as the scientific community, research trajectory and the position of insiders in this practice, allow and demand the rupture of certain aspects socially established, such as impersonality in academic-scientific writing.

Final considerations

Based on the objective of understanding self-citation patterns in scientific articles with a high impact factor from the journal *Nature*, we interpret, through the analyzes presented here, that the main specificities that arise around self-citation are related to the publication context, which is marked by power relations in production in groups of co-authors, which legitimize them in the scientific community. The self-mention feature is notorious as part of the self-citation under analysis. These characteristics, therefore, seem to transgress conventions around academic-scientific writing practices, presenting marks of heterogeneity in writing.

The publication context involving the Hard Sciences, specifically in the high impact factor journal *Nature*, as well as other contexts of literacy practices, is permeated by power relations, such as language, region, status of authors and type of research. Publication in this journal also allows legitimacy in the scientific community. The search for recognition can take place through partnerships between researchers, research groups and public and private institutions, national and international, implying co-authorship and the high number of researchers in the articles.

Given these findings, reflections and notoriety are opened around interinstitutional projects, in different areas of knowledge, which enable in-depth research, collaborative production in academic-scientific writing, which can provide greater and more qualitative reaches of scientific publication.

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