A critical analysis of the use of passives and relative clauses in Freshwater Ecology research articles

Un análisis crítico del uso de pasivas y cláusulas de relativo en los artículos de investigación en Freshwater Ecology

María Díaz-Redondo[1] ·   https://orcid.org/0000-0003-0476-4713

Universidad Nacional de Educación a Distancia (UNED)

Paseo Senda del Rey 7 · 28040 · Madrid (Spain)

ABSTRACT

Within the framework of comparative studies, this paper discusses the use of passives and relative clauses in Freshwater Ecology research articles. In a corpus of 20 articles, a critical analysis was undertaken in order to highlight existing differences between native and non-native English-speaking authors, male and female researchers, time periods and journal categories. Results revealed non-native English research writers made more use of both passives and relative structures. However, only gender differences were found in the use of relative clauses, with female researchers employing more relatives than their male counterparts. Temporal differences are consistent with previous research that noted a shift towards a less formal discourse in scientific writing. From a didactic point of view, the findings of this study are expected to broaden the knowledge of existing variations in scientific writing so that EAP scholars may develop practical writing strategies at the undergraduate or postgraduate level in universities worldwide.

Keywords: passives, relative clauses, English for Academic Purposes, research articles

RESUMEN

En el marco de los estudios comparativos, este artículo analiza el uso de pasivas y subordinadas en artículos de investigación sobre ecología de agua dulce. En un corpus de 20 artículos, se llevó a cabo un análisis crítico con el fin de resaltar las diferencias existentes entre autores nativos y no nativos anglófonos, escritores y escritoras, períodos de tiempo y categorías de revistas. Los resultados revelaron que los autores no nativos anglófonos hacen un mayor uso de las estructuras pasivas y subordinadas. Sin embargo, solo se encontraron diferencias de género en el uso de subordinadas, siendo más empleadas por las escritoras que por los escritores. Las diferencias temporales son consistentes con investigaciones previas que notaron un cambio hacia un discurso menos formal en la escritura científica. Desde un punto de vista didáctico, se espera que los hallazgos de este estudio amplíen el conocimiento de las variaciones existentes en la escritura científica para que los académicos de IFA puedan desarrollar estrategias prácticas de escritura a nivel de grado o posgrado en universidades de todo el mundo.

Palabras clave: pasivas, subordinadas, Inglés con Fines Académicos, artículos de investigación

1. Introduction

The present research study is framed in the field of English for Academic Purposes (EAP), a subdiscipline of English for Specific Purposes (ESP) that is concerned with the English used in academic studies and professional activities (Fuertes-Olivera & Pérez Cabello de Alba, 2012). Among the existing academic studies, the present study deals with research articles in Freshwater Ecology, an Environmental Sciences' subdiscipline that can be

---

[1]   **Corresponding author** · Email: mdiaz_redondo@yahoo.es

also defined as the 'ecology of continental waters' (Dodds, 2002). Kemp described ecology as "the study of the relationships that develop among living organisms and between these organisms and their unique environment" (1998, p. 116), and Dodds (2002) specified the list of continental waters as rivers, streams, marshes, lakes and groundwaters.

Research articles (henceforth, RAs) or research papers are short communications included in specialised journals as separate entities that present original research in a compressed way. They are increasingly the common way to spread knowledge among researchers. Due to their often fixed structure (e.g. Introduction, Methods, Results, Discussion) and journal's specific limitations (e.g. word limit), facts have to be presented in an effective way. Dealing with specialist discourse and language stylistic resources might be very challenging, particularly when the writer is not proficient in English.

Within communicative strategies, this work focuses on the study of the use of passive structures and relative clauses in RAs. On the one hand, the use of the passive generally meets the need to create impersonal constructions that detach the research from the researcher, thus giving more objectivity to the results. This grammatical construction is key in English to create the impression of objective reporting, since in other languages, such as Spanish, French or German, there are alternative rhetorical options (e.g. impersonal pronouns, respectively: "se", "on" and "es").

On the other hand, scientific writings in the abovementioned languages heavily rely on long explanations based on subordination after subordination. Non-native English-speaking researchers that have to write in English may fall into almost direct translations from their own language, producing dense paragraphs with many relative clauses that create confusion on the reader.

The present study aims at the identification of passives and relative clauses in Freshwater Ecology RAs, with a critical analysis of differences in their frequency of use that can be associated to authors' personal characteristics, to time periods and to categories of journals. In order to meet this objective, the present study seeks to answer the following questions:

- Is there any significant difference between native English-speaking research writers and non-native English-speaking research writers in the use (i.e. number and types) of passives and relative clauses in Freshwater Ecology RAs?

- Is there any significant gender difference in English Freshwater Ecology RAs in terms of the number and types of passives and relative clauses?

- Can any difference be found in the number and types of passives and relative clauses depending on the time period in which the RA was published?

- Is there any significant difference among Freshwater Ecology journals in terms of the number and types of passives and relative clauses depending on the categorisation of the journal by the journal impact factor?

Consequently, the present research aims at broadening the existing knowledge on cultural, gender, temporal and journal variations in scientific writing. Therefore, results and conclusions may be valuable for EAP scholars. Moreover, the selected topic has a number of implications for students and researchers in the field of Freshwater Ecology, in particular, and in Environmental Sciences or even Nature Sciences in general. Thus, it is expected that the findings from this study would help these students and researchers improve their linguistic knowledge regarding writing ability.

2. Theoretical framework

For the present study, it proved necessary to contextualize the research article within the field of genre analysis, the use of passives and relative structures as communicative structures in RAs, and the approach of previous comparative studies on the use of these structures in scientific RAs.

2.1. Genre analysis and the Research Article

Swales (1990) describes a genre as a distinct construction of a piece of discourse that has a clear communicative objective and that is recognised by the discourse community. Genre-based approach to specialised language is now well established in the ESP research world as an instrument for identifying patterns in written forms (Kanoksilapatham, 2015; Mozaheb, 2015). These patterns would consider similar form, rhetorical structures and terminology (Gledhill, 2000; Saeeaw and Tangkiengsirisin, 2014).

Notably, academic writing has to pay a special attention to those specific conventions that seem to ensure that the work is accepted by experts of a discourse community (Bonyadi *et al*., 2012). Since the 1990's, the interest in the study of professional written academic genres has been mainly devoted to the research article, which is now widely recognised as the most important genre of academic writing (Tse & Hyland, 2010; Hyland & Jiang, 2017). In research articles, authors usually address a knowledge gap or incorporate new information to existing research (Bonyadi *et al*., 2012). By engaging in the writing conventions of the research article, authors present their arguments in a way that is consistent with the expectations of specific disciplinary community (Mozaheb, 2015).

2.2. Communicative strategies: passives and relative clauses

Scholars wishing to disseminate their research in the international arena have to publish almost invariably in English language journals (Pérez-Llantada *et al*., 2011). Thus, academics have to be proficient in English and, at the same time, be aware of the most efficient communicative strategies to present their work in order to gain credibility, acceptance and international recognition (Sheldon, 2009; Bonyadi *et al*., 2012). These strategies encompass either rhetoric, semantic or pragmatic devices used among specialists in scientific communication (Hyland & Jiang, 2017).

The present study is concerned with the use of two key rhetoric devices: passives and relative clauses. On the one hand, studies on the use of rhetorical features in scientific discourse point out the use of an objective style of writing or impersonal speech as a way of presenting credible detached facts (Sheldon, 2009; Livnat, 2010; Hyland & Jiang, 2017). In that line, passives are structures that assist in what Livnat (2010) identifies as the "rhetoric of objectivity", for they present an absent researcher and the research as a separate entity. Therefore, the use of the agentless passive is a powerful rhetoric device in scientific writing for achieving impersonalisation and leaving the reader the choice to decide whether it refers to the writer, the reader, both of them, or a vague group of people (Grabe & Kaplan, 1997). The passive can also refer to the study or research itself and, as a consequence, the author creates the impression that the facts "speak for themselves", and that they can be faithfully replicated (Livnat, 2010).

*María Díaz-Redondo · A critical analysis of the use of passives and relative clauses
in Freshwater Ecology research articles*

143

On the other hand, presenting relevant information as acceptable implies the use of accurate descriptions. For that reason, authors may tend to make use of the relative clause, a post-modifying structure similar to an adjective whose key function is the provision of detailed characterisation or additional information about the head nouns they accompany (Tse & Hyland, 2010). Moreover, these authors claim that the role of relative clauses may be more complex and that, instead of delimiting the referent they may widen its characterisation and, thus, serve as a vehicle for discussion. The analysis of the use and frequency of these structures in RAs for the provision of evaluative information is of particular interest for discourse analysis (Abadikah, 2012).

2.3. Comparative studies

Comparative studies on the RA would typically collect samples from the same discipline or from different disciplines, and then contrast texts with a view on exploring differences and similarities in structure as well as frequency and types of different rhetoric, semantic or pragmatic devices. Research into specialist discourse is inevitably associated to specific areas of knowledge or academic disciplines but some of them seem to have received more attention than others (Basturkmen, 2010). Particularly, abundant investigation devoted to RAs in Medical Science (Gledhill, 2000; Millar *et al*., 2013; Mozaheb, 2015) was found in the course of this research.

Only very few studies address Environmental Science RAs (but see Bonyadi *et al*., 2012 and Saeeaw & Tangkiengsirisin, 2014). The latter authors consider Environmental Science as a hard-applied discipline, and Applied Linguistics as a soft-applied discipline, and focused their study on the analysis of 200 RAs' abstracts from both disciplines, comparing moves and sub-moves and rhetorical strategies. Bonyadi *et al*. (2012) analysed the frequency and types of hedges in Discussion sections of Environmental Sciences Research Articles (RAs) but with a view of contrasting English native and non-native writers (Iranians writing in English and in Farsi).

There are many articles on the use of passive voice in scientific RAs, but very little research has been devoted to the specific study of relative clauses (but see Tse & Hyland, 2010). The study by Tse & Hyland (2010) focused on the frequency of relative clauses in 200 journal descriptions from four contrasting disciplines (Applied linguistics, Sociology, Biology and Engineering).

On the comparative use of passives among languages, Livnat (2010) analysed the use of these impersonal constructions in 30 scientific articles in Hebrew. Using a corpus of 60 scientific RAs from six journals on several disciplines (chemistry, biology, psychology), Alvin (2014) studied the proportion of passives, the contexts and forms, and the use of passives in the past and present century. Tarone *et al*. (1998) examined the frequency of the active and passive forms in two astrophysics RAs. Finally, Hyland & Jiang (2017) undertook a comparative study of key informal elements in RAs published over the last 50 years in four representative soft and hard-applied disciplines (Applied Linguistics, Sociology, Electrical Engineering and Biology).

To the best knowledge of the author of the present research, the comparative study of the use of passives and relative clauses in RAs in the field of Freshwater Ecology (a sub-discipline of Environmental Sciences) has not yet been addressed in previous literature. Thus, this study aims at covering that knowledge gap, exploring at the same time the potential influence of Anglophone background, gender, temporal perspective and journal category in the comparative.

3. Methods

Methods adopted for this study include the description of the corpus construction, the procedure for the textual analysis of passives and relative clauses, and the approach to the assessment of results.

3.1. Corpus

The corpus of the present comparative study consists of 20 Research Articles (RAs) published in ISI-indexed journals in the field of Freshwater Ecology. These RAs were selected on the basis of two criteria: a) the first author in half of the corpus was a native English researcher and a non-native English researcher in the other half of the corpus; b) the first author in half of the corpus was a male researcher and a female researcher in the other half of the corpus (Table 1).

Nationality	Male	Female	Percentages
Native English-speaking researchers			
UK	1	2	15%
USA	3	2	25%
Australia	1	1	10%
Subtotal	5	5	50%
Non-native English-speaking researchers			
The Netherlands	2	0	10%
Germany	2	0	10%
Spain	1	1	10%
France	0	2	10%
Italy	0	1	5%
Portugal	0	1	5%
Subtotal	*5*	*5*	*50%*
Total	10	10	100%

Table 1. Selected RAs classified by Nationality and Gender.

Afterwards, the selected articles were classified according to the time period they were published, identifying four time periods (Table 2).

Time period	Number of RAs	Percentages
Before 1980	3	15%
1990-2000	2	10%
2000-2010	3	15%
2010-2020	12	60%
Total	20	100%

Table 2. Selected RAs classified by Time Period of publication.

Finally, these articles were classified according to four categories of the impact factor corresponding to the journal in which they were published (Table 3). The journal impact factor (JIF) is an index that classifies journals according to the yearly average number of citations of articles published in that journal; therefore, the higher the JIF, the higher the relative importance of a journal within its field. The JIF selected in the present study is the one from ResearchGate (www.researchgate.net), the worldwide social network for scientists.

María Díaz-Redondo · A critical analysis of the use of passives and relative clauses
in Freshwater Ecology research articles

145

Journal impact factor	Number of RAs	Percentages
JIF ≤ 1	1	5%
1 > JIF ≤ 2	6	30%
2 > JIF ≤ 3	8	40%
JIF > 3	5	25%
Total	20	100%

Table 3. Selected RAs classified by Journal Impact Factor.

3.2. Textual analysis: passives and relative clauses

Since the present research focuses on the critical analysis of the use of passives and relative clauses in Freshwater Ecology RAs, it is necessary to first describe how these structures have been identified, classified and quantified.

On the one hand, the use of passives, as rhetorical devices, aims at creating impersonal constructions. The basic form of the passive is "be + past participle (pp)" but there are other types. The present study is based on the classification by Alvin (2014):

- Basic (be + pp)

- Progressive (be + being + pp)

- Perfective (have + been + pp)

- Modal (modal + be + pp)

- Modal perfective (modal + have + been + pp)

- To-infinitive (to + be + pp)

- Non-finite –ing (being + pp)

For the identification of passives, as composed by more than one item, the method consisted of using a regular expression query based on the syntactic structure of the different types of passives (e.g. perfective: have + been + past participle).

On the other hand, we use relative clauses to give additional information about something without starting another sentence. They begin with a relative pronoun or a relative adverb and can be placed between commas (non-defining relative clauses) or not (defining relative clauses). Therefore, the present work distinguishes two categories of relative clauses according to the introducing feature:

- Relative pronouns: who, which, whose, whom, that

- Relative adverbs: when, where, why

Relative structures were easily retrieved through a search of individual items, either relative pronouns (e.g. who, that) or relative adverbs (e.g. when, why), although each item was manually checked to confirm it was actually part of a target relative structure.

Both passives and relative structures have been quantified in total and per types of passives and relatives. In order to better approach the statistical analysis, the number of structures identified have been divided by number of RAs, therefore results are compared as number of structures per paper.

3.3. Assessment

Results with the number of structures per paper were obtained in tables (Annex II and Annex III) and a series of bar graphs were produced in order to better understand those results. Therefore, according to the research questions of this study, results are organised in the following manner:

1. Native and non-native English researchers: total number and number per type of structures (passives or relatives) per paper used by native or non-native English researchers.

2. Gender: total number and number per type of structures (passives or relatives) per paper used by male or female researchers, and also combined by male/female, native/non-native English researchers.

3. Time periods: total number and number per type of structures (passives or relatives) per paper classified by four time periods.

4. Journal impact factor: total number and number per type of structures (passives or relatives) per paper classified by four categories of journal impact factor.

In the next section, results for each of the abovementioned sections are followed by the analysis of whether relevant differences were found.

4. Results

Outcomes of the study are presented here according to the research objectives, including not only the variance between native and non-native English-speaking researchers, but also gender, temporal and journal category variations.

4.1. Native and non-native English-speaking researchers

The first research question focused on the existence of significant differences between native English-speaking researchers and non-native English researchers in the use (i.e. number and types) of passives and relative clauses in Freshwater Ecology RAs.

Figure 1 shows the total number of passives and relative clauses per paper by native or non-native English researchers. We can appreciate that non-native English researchers used more passives than native English researchers, whereas the total number of relatives was higher in native than in non-native English researchers.
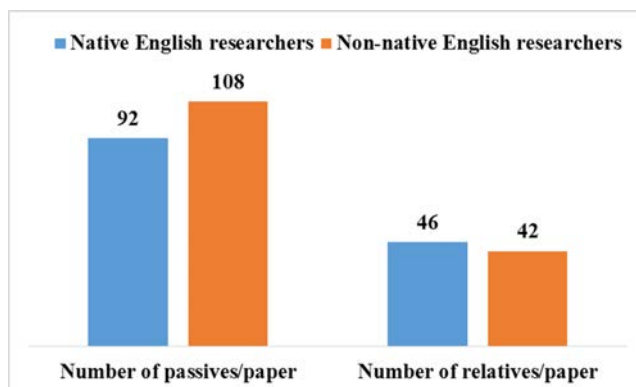
María Díaz-Redondo · A critical analysis of the use of passives and relative clauses
in Freshwater Ecology research articles

147

Figure 1. Number of passives and relatives per paper used by native or non-native English researchers

When analysing the types of passives (Figure 2.a), it is noteworthy that the use of the basic structure (be + past participle) was more elevated than the rest of passives, especially among non-native English researchers. There was also a slightly higher use of perfectives (have + been + past participle) among non-native English researchers and the use of modal structures (modal + be + past participle) was slightly higher among native English researchers. As for the types of relatives (Figure 2.b), relative pronouns were far more frequently used than relative adverbs. However, no other remarkable differences could be found between native or non-native English researchers.
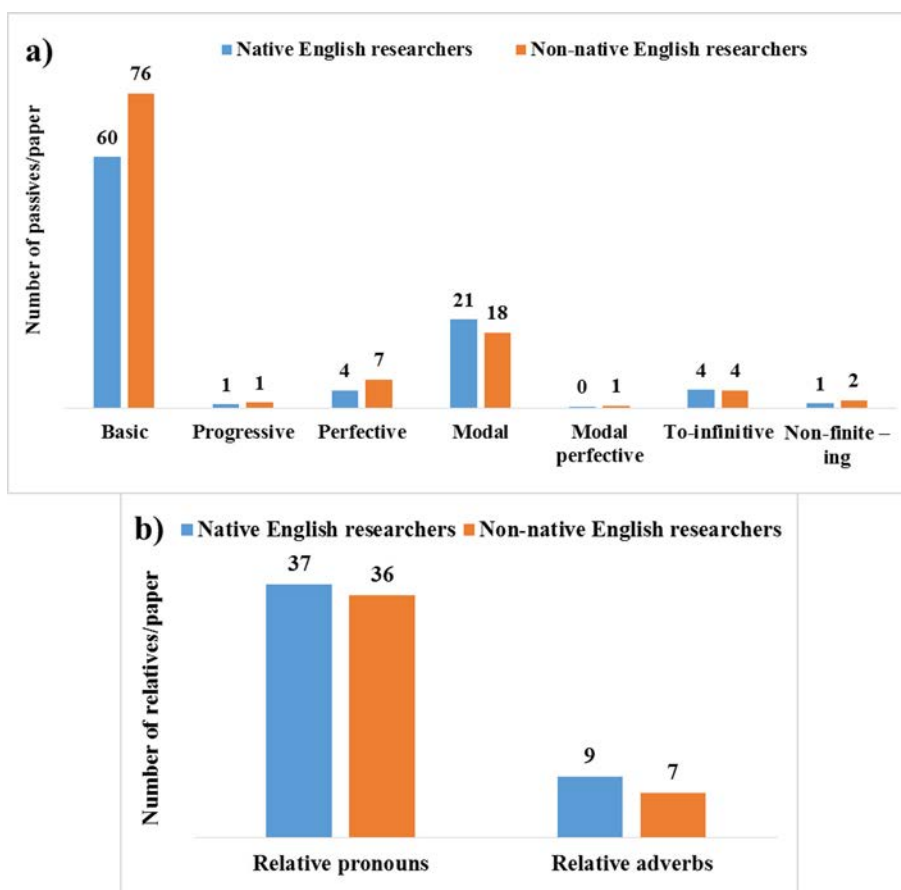
Figure 2. a) Number of passives per paper used by native or non-native English researchers and classified by types of passives; b) Number of relatives per paper used by native or non-native English researchers and classified by types of relatives

4.2. Gender variations

The second research question was directed towards possible gender differences regarding the number and types of passives and relative clauses. In that sense, Figures 3 and 4 feature the total number of passives and relatives per paper used by male or female researchers (Figure 3), and also combined by male/female, native/non-native English researchers (Figure 4).
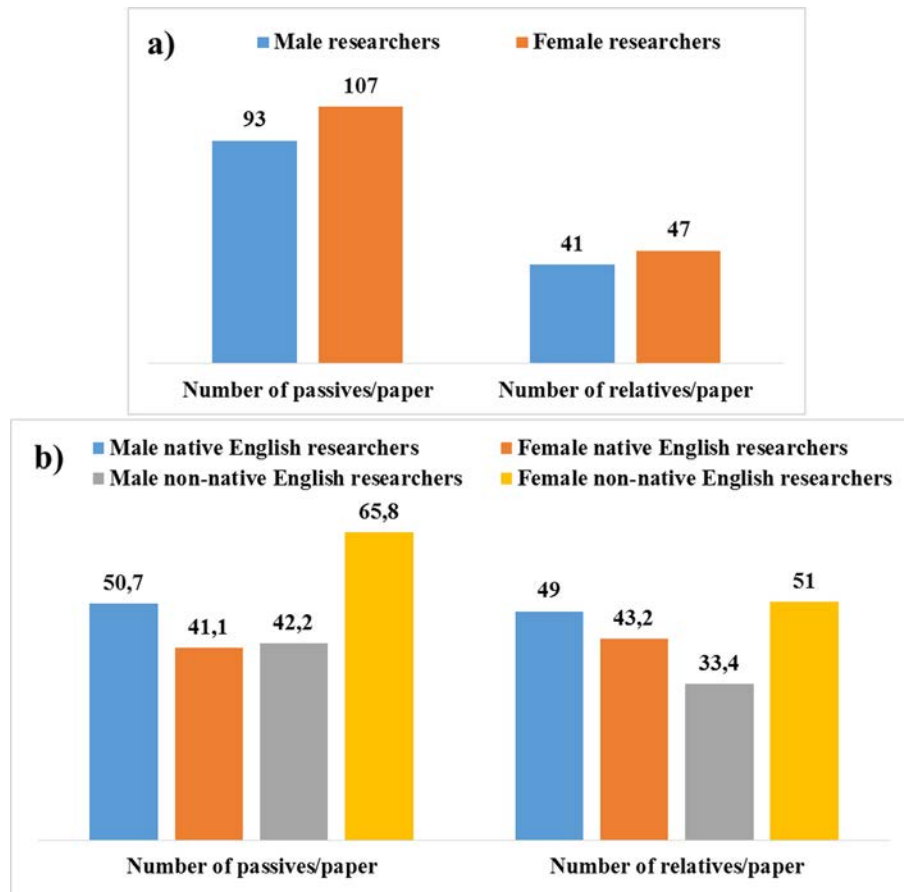

Figure 3.a) Number of passives and relatives per paper used by male or female researchers; b) Number of passives and relatives per paper used by male/female, native/non-native English researchers

3.a) shows that female researchers used more passives and relatives than male researchers (Figure 3.a). Moreover, when analysing the combination of gender and native/non-native (Figure 3.b), we can acknowledge that female non-native English researchers made more use of passive and relative structures than male non-native English researchers. We can also observe that the greatest values in the use of relative clauses are found in male native and in female non-native English researchers.

Continuing with the analysis of passives and gender, Figures 4 and 5 show the types of passives and relatives per paper used by male or female researchers (Figure 4), and also combined by male/female, native/non-native English researchers (Figure 5).

María Díaz-Redondo · A critical analysis of the use of passives and relative clauses in Freshwater Ecology research articles
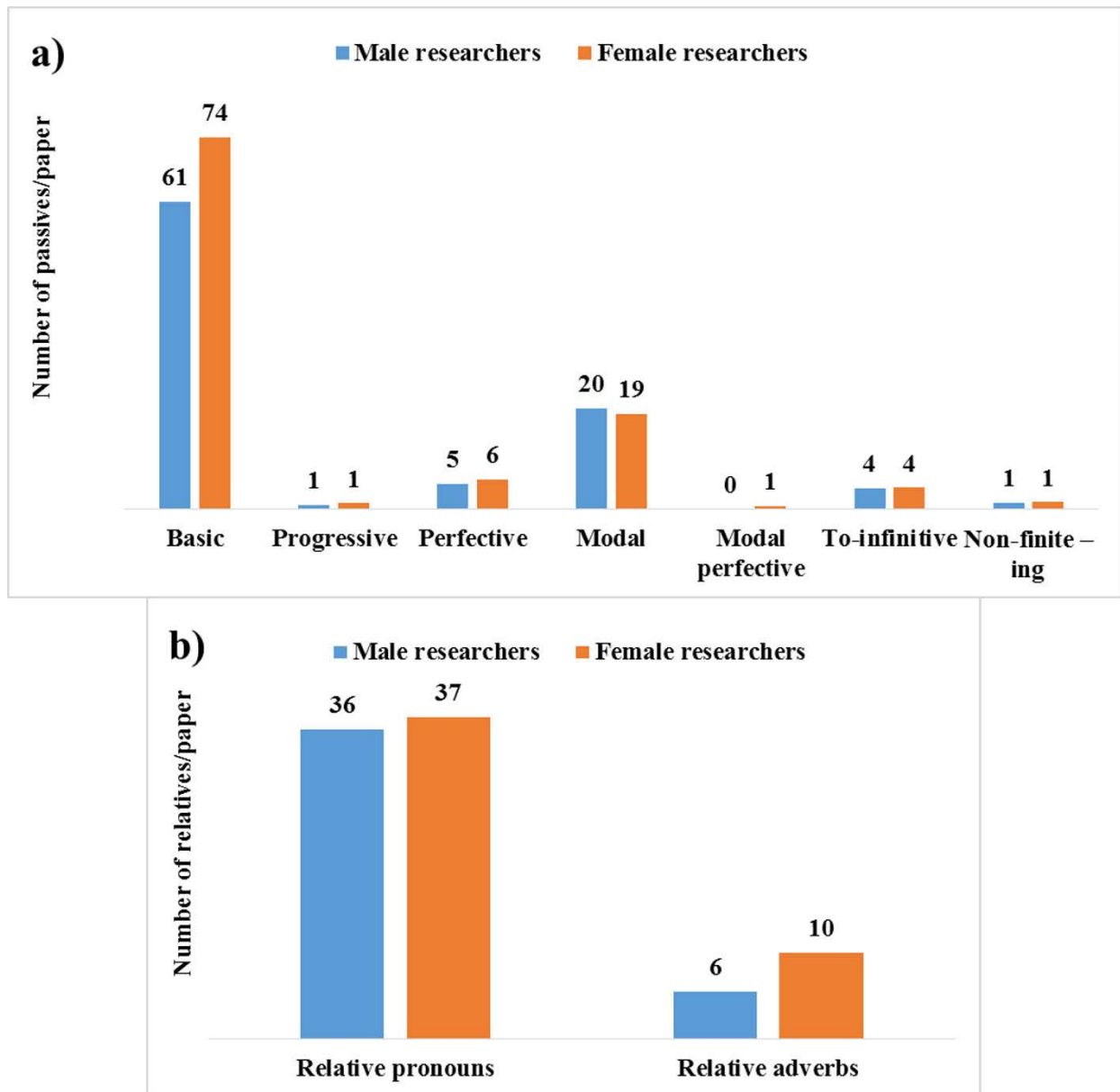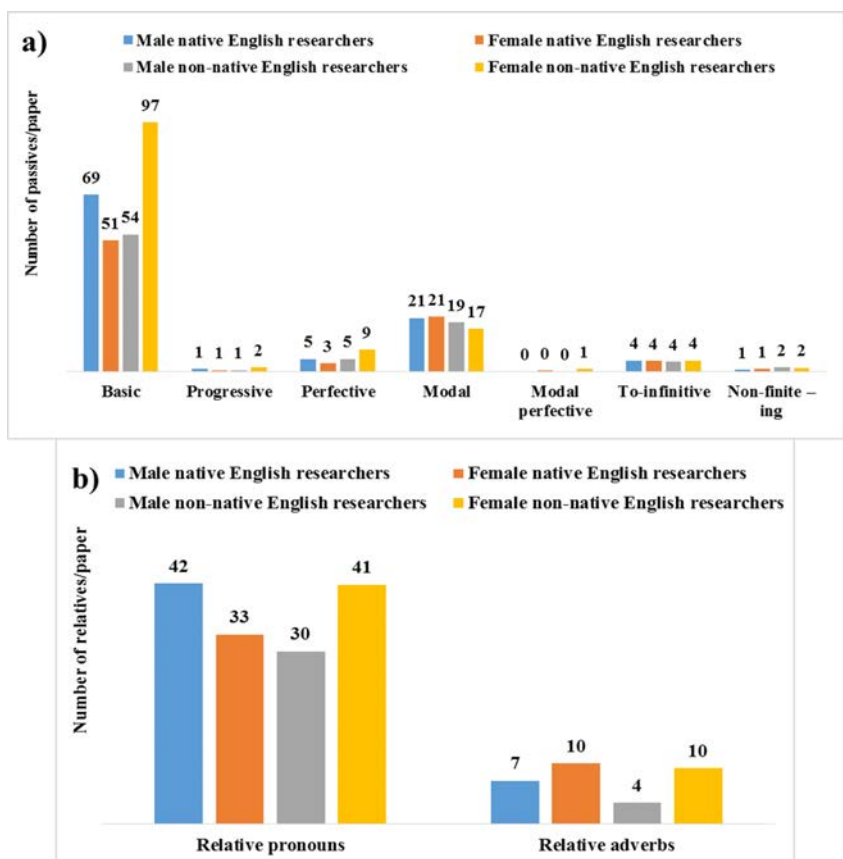
149

Figure 4. a) Number of passives per paper used by male or female researchers and classified by types of passives; b) Number of relatives per paper used by male or female researchers and classified by types of relatives

According to Figure 4.a, we can observe that there was a higher use of the basic structure by female researchers, but there were no other significant differences (Figure 4.a). As may be noted in Figure 4.b, although the use of relative pronouns was similar between male and female researchers, the latter employed nearly twice as many relative adverbs as the former.

150
María Díaz-Redondo · A critical analysis of the use of passives and relative clauses
in Freshwater Ecology research articles

Figure 5. a) Number of passives per paper used by male/female, native/non-native English researchers and classified by types of passives; b) Number of relatives per paper used by male/female, native/non-native English researchers and classified by types of relatives

As shown in Figure 5.a, the use of basic passives by female non-English researchers was fairly higher than male non-English researchers; however, male English writers used more of these structures that their female counterparts. Lastly, according to Figure 5.b, a higher use of relative pronouns and adverbs were found in female non-native researchers in comparison with male non-native researchers. On the other hand, male native English researchers used more relative pronouns but less relative adverbs than female English researchers.

4.3. Time evolution

The third research question inquired whether any difference could be found in the number and types of passives and relative clauses depending on the time period in which the RA was published.

Figure 6 shows the total number of passives and relative clauses per paper classified by four time periods, revealing that the distribution in the use of passives among time periods was not even. Until 1980, the number was high, but the last decade of the 20th century saw an increasing tendency in the number of passives per paper. In comparison, the numbers in the two decades of the 21st century were lower. Regarding relatives, the number of relatives per paper was certainly low until 1980, whereas in the 1990's the number multiplied by almost three times. The two decades of the 21st century presented a quite similar relatively high number of relatives per paper.

María Díaz-Redondo · A critical analysis of the use of passives and relative clauses in Freshwater Ecology research articles
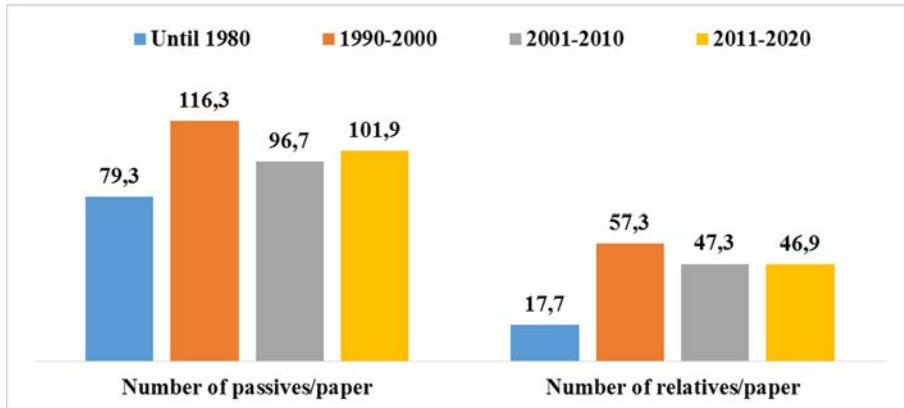
151

Figure 6. Number of passives and relatives per paper classified by time period

Figure 7 presents the number and types of passives and relative clauses used in different time periods. Figure 7.a shows an increasing trend until 2010 by the modal passive and then a retrocession. The basic passive reached its peak in the 1990's, then decreased in the 2000's and increased again in the last decade. Accordingly, the distribution of relative pronouns by time periods (Figure 7.b) was similar as that of the total number of relatives per paper represented in Figure 6.
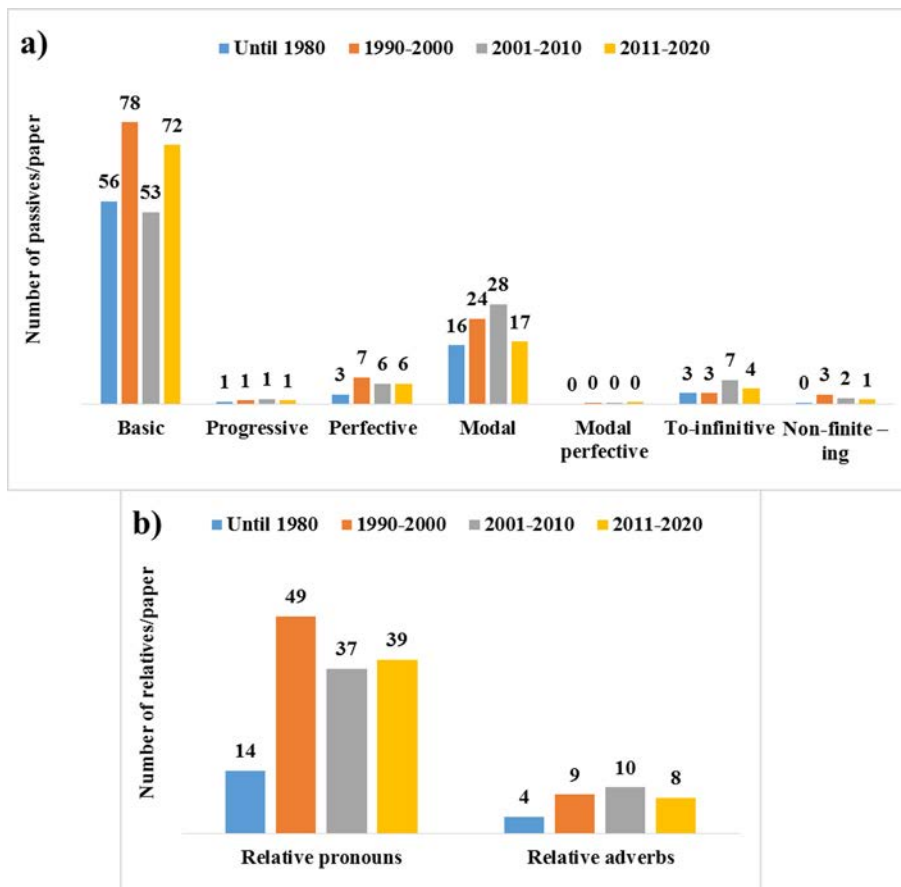
Figure 7. a) Number and types of passives per paper classified by time period; b) Number and types of relatives per paper classified by time period

4.4. Journal categorisation

In order to respond to the last research question of this study, this subsection includes the critical analysis of the number of passives and relatives found per paper within a classification of the journal impact factor (JIF).

Consequently, Figure 8 presents the total number of passives and relative clauses per paper classified by category of JIF.
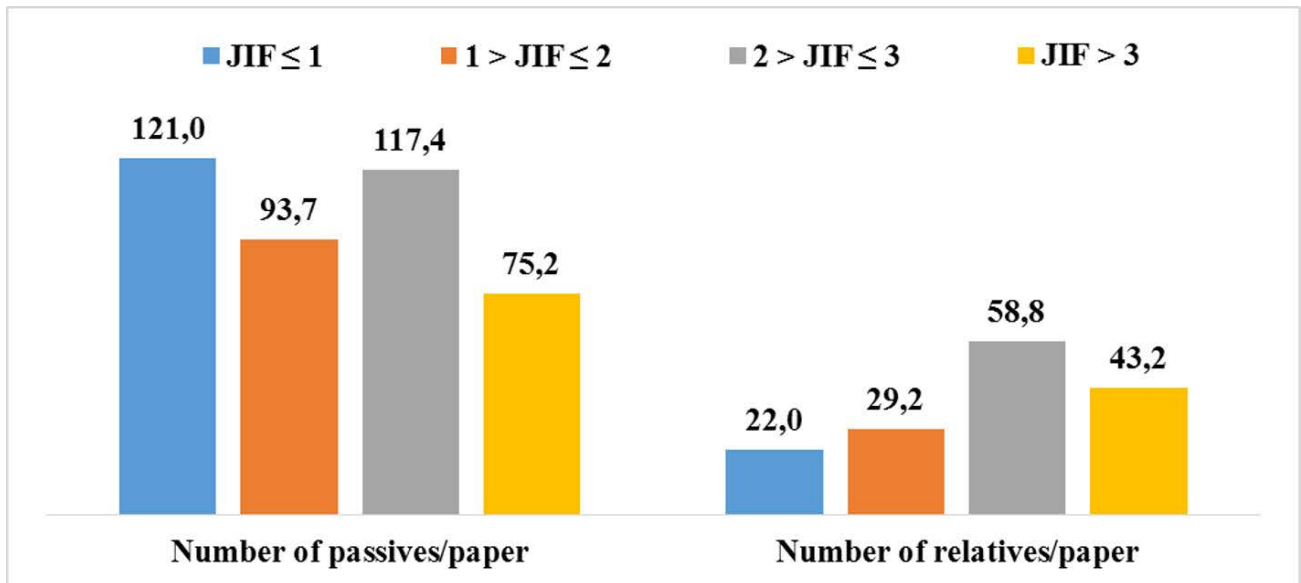

Figure 8. Number of passives and relatives per paper classified by JIF

With regard to passive structures, Figure 8 shows that there wa no correlation between the number of passives per paper and the JIF. As for relatives, there seemed to be a positive correlation, but there was a higher number in the range 2 > JIF ≤ 3 than in the rank JIF > 3.

Finally, Figure 9 illustrates the types of passives and relative clauses classified by categories of journal impact factor.

María Díaz-Redondo · A critical analysis of the use of passives and relative clauses in Freshwater Ecology research articles
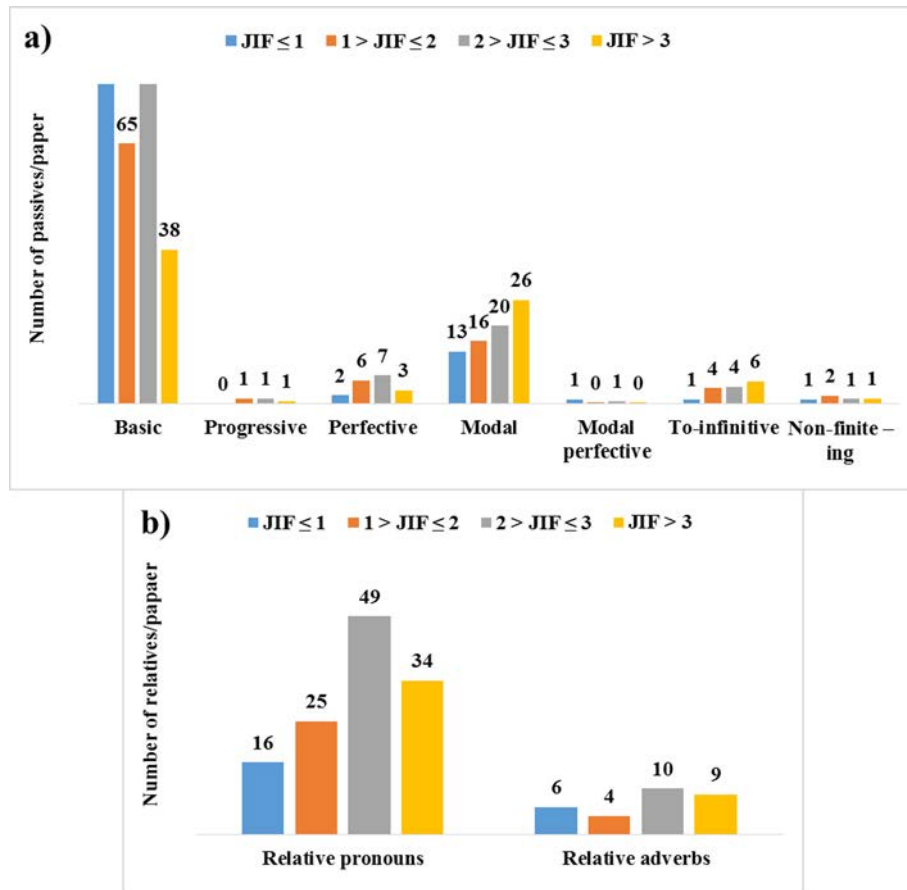
153

Figure 9. a) Number and types of passives per paper classified by JFI; b) Number and types of relatives per paper classified by JFI

Regarding passive types (Figure 9.a), the distribution of both modal passives and the type to-infinitive passive (to + be + past participle) followed a very similar increasing correlation between the number of passives and the JIF. The pattern of perfective passives showed more number per paper in journals with $1 > JIF \leq 2$, and $2 > JIF \leq 3$ and there was no correlation in the basic passive.

The distribution of relative pronouns in Figure 9.b significantly governed the distribution of total relatives in Figure 8, with more relative pronouns in journals with a JIF between 2 and 3. The pattern of relative adverbs showed a more variable distribution, with less number in the rank of JIF between 1 and 2.

5. Discussion and concluding remarks

The following discussion begins with a comparative analysis that joins the most relevant findings to the research objectives and contextualises them with previous research, and concludes with the introduction of potential pedagogical implications and recommendations for future research.

5.1. Comparative analysis

Results from this study showed that there were differences in the use of passives and relatives by native and non-native English speaking research writers, but only gender differences in the use of relatives. There were also differences in the number of these structures in relation to the time period in which the RAs were published.

However, no relevant correlation could be found between the use of passives and relatives and the categorisation of journals by ranges of journal impact factor.

In the light of these results, this study has proved similarities and divergences with previous research. On the one hand, the predominant use of the passive voice by non-Anglophone authors was consistent with the study by Pérez-Llantada *et al.* (2011), which extracted the opinion that there was a predilection for a heavy use of the passive among Spanish authors. Similarly, the present research has corroborated the conclusion by Alvin (2014) that the basic form would be the most common type of passive. But this study had contradicted the assertion by Hyland & Jiang (2017) that the scientific writing context would be dominated by conventions of formality with no influences of gender, status and other social features.

On the temporal perspective, results from this study aligned with other studies (Seoane, 2013; Alvin, 2014; Hyland & Jiang, 2017) in finding a peak in the use of passives in scientific discourse by the end of the 20th century. The present research confirmed the conclusions of those previous investigations, corroborating the theory that scientific texts would be turning to the active voice and impersonalisation and that this could be a sign of what Seoane (2013) defined as "the democratisation of the scientific discourse".

Since this study analysed a small number of RAs from a very specific sub-discipline, it has to be noted that results should be interpreted with caution and generalisations should be prevented. Additional research could be devoted to comparative studies in the use of these structures in RAs across other soft and hard scientific disciplines (e.g. geology, geography). Moreover, the analysis of journal recommendations' influence on the use of these structures would deserve particular attention, i.e. guides for authors sometimes support the use of certain rhetorical structures, like the active voice (Millar *et al.*, 2013), or discourage the use of others, like personal pronouns.

5.2. Pedagogical implications

As a pedagogical implication, this study hopes fuelling an alertness among language academics on the necessity of empowering students and scholars in different disciplines with the particular strategies of the current specialist written discourse that can lead them to success in the research world.

There can be little doubt of the growing internationalisation of teaching and research in English in world countries where English is a foreign language. The importance of English as lingua franca in scientific writing has already been highlighted in the present study. Researchers seeking to write scholarly articles must be aware of the conventionalisms of not only the structure, but the English rhetorical devices of their disciplines.

Within the academic arena, it also has to be noted that there is an evident increasing trend towards using English as a language of instruction in universities all around the world. And yet, to the best knowledge of the author, there is little or no emphasis in higher education on the teaching of the specialist discourse within the existing academic genres, such as the Research Article. A grounds-up approach would teach students the appropriate genre structure, as well as the range of available rhetorical features, where they can be best placed and for what purpose. For example, in the present study, it has been concluded that the use of passives in Freshwater Ecology RAs tends to decline towards a more direct style with the use of the active voice and, therefore, an ESP course designed to Freshwater Ecology students would include whether it is more suitable the use of the passive or the active voice in different sections of the RA.

*María Díaz-Redondo · A critical analysis of the use of passives and relative clauses
in Freshwater Ecology research articles*

155

Declaration of conflicting interests

Funding

About the author

Dr. María Díaz-Redondo holds a BA in English Studies from UNED (Spain), a BSc in Environmental Sciences from UAM (Spain), PhD in River Restoration and Management from the University of Lisbon (Portugal). Since 2000, her professional career has focused on the field of Freshwater Ecology, and as such she chose the analysis of the academic English used in research articles in this field of expertise. Her main motivation for this study revolved around helping researchers in this field to be aware of the stylistic conventions and avoid overuse or misuse that can lead to publishing failure, and at the same time, to contribute in broadening the understanding of this topic among ESP students and lecturers.

Acknowledgements

References

Abadikhah, S. (2012). The effect of mechanical and meaningful production of output on learning English relative clauses. *System*, *40*(1), 129–143. https://doi.org/10.1016/j.system.2012.01.001

Alvin, L. P. (2014). The passive voice in scientific writing. The current norm in science journals. *Journal of Science Communication*, *13*(1), A03. https://doi.org/10.22323/2.13010203

Basturkmen, H. (2010). Developing courses in English for specific purposes. New York: Palgrave Macmillan. ISBN: 978-0-230-22798-9

Bonyadi, A., Gholami, J., & Nasiri, S. (2012). A Contrastive Study of Hedging in Environmental Sciences Research Articles. *Journal of Language Teaching and Research*, *3*(6), 1186–1193. https://doi.org/10.4304/jltr.3.6.1186-1193

Dodds, W. (2002). *Freshwater ecology: concepts and environmental applications*. London: Elsevier. ISBN: 0-12-219135-8

Fuertes-Olivera, P. A., & Pérez Cabello de Alba, B. (2012). El papel de los diccionarios pedagógicos especializados en la enseñanza/aprendizaje del ESP. *Epos : Revista de Filología*, (28), 277. https://doi.org/10.5944/epos.28.2012.12276

Gledhill, C. (2000). The discourse function of collocation in research article introductions. *English for Specific Purposes*, *19*(2), 115–135. https://doi.org/10.1016/S0889-4906(98)00015-5

Grabe, W., & Kaplan, R. B. (1997). On the writing of science and the science of writing: Hedging in science text and elsewhere. *Research in Text Theory*, 151-167. https://doi.org/10.1515/9783110807332

Hyland, K., & Jiang, F. K. (2017). Is academic writing becoming more informal? *English for Specific Purposes*, *45*, 40–51. https://doi.org/10.1016/j.esp.2016.09.001

Kanoksilapatham, B. (2015). Distinguishing textual features characterizing structural variation in research articles across three engineering sub-discipline corpora. *English for Specific Purposes*, *37*(1), 74–86. https://doi.org/10.1016/j.esp.2014.06.008

Kemp, D. (1998). *The environment dictionary*. London: Routledge. ISBN: 0-415-12753

Livnat, Z. (2010). Impersonality and Grammatical Metaphors in Scientific Discourse. The Rhetorical Perspective. *Lidil*. *Revue de linguistique et de didactique des langues*, (41), 103-119. https://doi.org/10.4000/lidil.3015

Millar, N., Budgell, B. & Fuller, K. (2013). Use the active voice whenever possible: The impact of style guidelines in medical journals. *Applied Linguistics*, *34*(4), 393-414. https://doi.org/10.1093/applin/ams059

Mozaheb, M. A. (2015). Comparative Genre-Based Study of Research Articles' Method and Results Sections Authored by Iranian and English Native Speakers. *International Journal of Arts & Sciences*, *08*(06), 139-152. https://doi.org/10.4013/cld.2014.123.07

Pérez-Llantada, C., Plo, R., & Ferguson, G. R. (2011). "You don't say what you know, only what you can": The perceptions and practices of senior Spanish academics regarding research dissemination in English. *English for Specific Purposes*, *30*, 18–30. https://doi.org/10.1016/j.esp.2010.05.001

Saeeaw, S., & Tangkiengsirisin, S. (2014). Rhetorical Variation across Research Article Abstracts in Environmental Science and Applied Linguistics. *English Language Teaching*, *7*(8), 81–93. https://doi.org/10.5539/elt.v7n8p81

Seoane, E. (2013). On the conventionalisation and loss of pragmatic function of the passive in Late Modern English scientific discourse. *Journal of Historical Pragmatics*, *14*(1), 70–99. https://doi.org/10.1075/jhp.14.1.03seo

Sheldon, E. (2009). From one I to another: Discursive construction of self-representation in English and Castilian Spanish research articles. *English for Specific Purposes*, *28*(4), 251–265. https://doi.org/10.1016/j.esp.2009.05.001

Swales, J.M. (1990) *Genre analysis: English in academic and research settings*. Cambridge: Cambridge University Press. ISBN: 0-521-328691

Tarone, E., Dwyer, S., Gillette, S., & Icke, V. (1998). On the Use of the Passive and Active Voice in Astrophysics Journal Papers: With Extensions to other Languages and other Fields. *English for Specific Purposes*, *17*(1), 123–138. https://doi.org/10.1016/S0889-4906(97)00032-X

Tse, P., & Hyland, K. (2010). Claiming a territory: Relative clauses in journal descriptions. *Journal of Pragmatics*, *42*(7), 1880–1889. https://doi.org/10.1016/j.pragma.2009.12.025