

THE USE OF CONNECTORS IN SCIENTIFIC ARTICLES BY NATIVE AND NON-NATIVE WRITERS

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BIOGRAPHICAL DETAILS

M^a Luisa Carrió is a professor of English language at the Polytechnic University of Valencia, where she teaches industrial engineers. Her research areas are ESP, second language acquisition and corpus linguistics - analysis of academic discourse. Her publications include “Genre analysis: sentence structure in medical abstracts” (Barcelona University, 1997); “Translation of complex noun phrases in agricultural articles” (Santiago de Compostela University, 1998); “Relative clauses in complex noun phrases in medical articles” (Cádiz University, 1999); “The use of phrasal verbs by native and non-native writers in technical articles” (Peter Lang, 2002) and “Las implicaciones de los errores léxicos en los artículos en inglés científico-técnico” (RAEL, vol. 2). Her doctoral dissertation focuses on error analysis and variations of the language produced by native and non-native writers. She is now Head of the Applied Linguistics Department of the Polytechnic University.

Abstract:

The English language is widely used all round the world by native (NW) and non-native writers (NNW), as it has been considered a lingua franca for the last decades. The scientific community is conscious of this fact, so, contrastive studies of the use of certain structures by writers with different cultural and linguistic backgrounds have been increasingly attracting scholarly attention. There is evidence to suggest that words used by writers of academic papers do not appear with the same frequency in the same context.

In the present study, our aim is to provide the classification of different connectors, calculating their frequency and variation in their use. The research is based on a corpus of 100 scientific articles, 50 written by NWs and 50 by NNWs. An evaluation of the use of connectors is proposed, contrasting the different number of their occurrences in the corpus. The examples and data in our analysis demonstrate to NNWs the frequency and distribution of connectors used by NW, it also provides some guidelines NNWs can follow to improve their formal style in writing scientific articles.

1. INTRODUCTION

Globalisation is a fact that we cannot ignore - with the development of new technologies, international communication has been increasing, so that now we are able to work closely with people from other continents. In this international environment, the Internet has been one of the most interesting means of cultural and also economic exchange, the English language being the lingua franca in most cases. The importance of how we write, how we express our feelings or thoughts to people who are thousands of kilometres away has been growing, and differences between written and oral communication have become the focus of a lot of recent studies (Brown & Yule, 1983; Halliday, 1989; McCarthy, 1991; Van Lier, 1995; Dudley-Evans & St. John, 1998). Also, the pressure felt by writers who realise that millions of people can read the information they have placed on the web is not the same as in oral speech, when you can see your audience and guess their feelings.

A lot of people nowadays are able to communicate with other people via the Internet in their mother tongue (L1) or using a second language (L2) learnt in their own country or in the country where the language is natively spoken. Nowadays, the English language is the most used among authors from different nationalities and this can be observed in the research articles published in journals. Most indexed journals ask for articles in English, which causes authors from different cultural backgrounds to write in this international language. As a consequence of this, authors that communicate in a second language cannot avoid using structures that are more common in their mother tongue and thus cultural characteristics are transmitted (Connor, 1996; Ellis, 1994; 1997). Quirk & Stein (1993: 201) state that the most typical structures of the L1 are the model to which structures in the foreign language are built, "We therefore tend to construct our sentences so as to move in linear order from the most known to the most unknown, from the *given* to the *new*." Although the production of native writers (NW) is often similar to or the same as that of non-native writers (NNW) but, in some contexts, there can be found variations that affect text cohesion and quality of the written language.

The term *variation* is introduced in this paper as different manifestations in the language that are not mistakes or errors (Ellis, 1997) but are the differences found in the discourse produced by writers with different linguistic and cultural antecedents, although they share the knowledge of the specialist content and academic way of expressing their thoughts. Smith and Wilson (1983: 182) mention a similar term that they call *register variation*, but they apply it to the variations produced depending on the context. This is not exactly our understanding of variation, as we consider the different performances of different writers in the same kind of linguistic production and register.

Our research is focused on *English for Professional and Academic Purposes* (Piqué, Andreu-Besó & Viera, 1994; Dudley-Evans and St. Johns, 1998; Alcaraz, 2000) or as Cortese and Riley name it, *Domain-specific English* (Cortese & Riley, 2002). We are analysing the genre found in scientific journals or web-sites, which is the most common way of exchanging scientific or technical ideas or carrying out joint projects. Words in specific settings must express the ideas clearly, misinterpretations cannot be allowed and an appropriate balance must be developed between the propositional content and the reader through evaluation and hedging (Hunston, 1994; Hyland, 1996).

Hunston and Thomson (2000: 5) define evaluation as "The broad cover term for the expression of the speaker's or writer's attitude or stance towards, viewpoint on, or feelings about the entities or propositions that he or she is talking about." Martin (1996: 3) and White (2001), referring to interpersonal meanings that enable the development of the writer's point of view, call this term appraisal. In the present paper, our aim is to connect the assumption that evaluative language as a discourse phenomenon is a rhetorical means of positioning and persuading readers to accept academic writers' claims with the idea of variations in the language. The international reader should accept language variations as a way to enrich and enlarge communication among

different readers.

In the article we will discuss the evaluation of connectors, taking into account the writer's assumptions about the use of connectors in scientific articles (Hunston and Thomson, 2000). The writer expresses his /her point of view when he/she chooses a connector in the discourse, but this selection changes depending on the mother tongue of the writer. Scientists can disperse explicit and implicit evaluations throughout the text to indicate how the text should be interpreted, and connectors play an important role in inferring coherence (Halliday & Hasan, 1976: 226; Lorenz, 1999: 55).

Connectors are devices used to state the relationship between units of discourse (Biber et al. 1998) and they include conjunctions, some adverbs (e.g. *firstly, namely, alternatively*), and some prepositional phrases (e.g. *in brief, in fact, of course*). Connectors (Quirk et al. 1972; Swan, 1995) are an important part in the sentence structure and provide coherence in the total structure of the text, but for NNWs they are hard to master due to their variety and lack of correlation with L1. We have selected connectors as an area of study, our experience showing that authors avoid them when writing technical articles, and that in teaching English they are given inadequate attention.

The objectives of the present study are:

- Observe the frequency of the connectors used by NWs and NNWs in scientific articles, highlighting the most frequent ones and the total occurrences found;
- Consider variations in the use of the most frequent connectors and the reason why they are used in a different way by the two groups of writers;
- Discuss the role of culture when NNWs use English as an international language.

On establishing the theoretical framework and objectives of the present study, the materials and methods used are discussed in the next section.

2. MATERIALS AND METHOD

In order to obtain sound conclusions, 100 scientific articles from international journals were selected, 50 written by Spanish NNWs and 50 by English NWs. Different journals, from among the most well-known in the given areas of study, were selected to generate a representative corpus. The article authors were NWs from the United Kingdom or United States, and the NNWs were from Spain, their university affiliation was also taken into account.

Once the research corpus had been compiled, all the connectors were located and counted, and we calculated their percentages and frequency in the corpus using Scott's computer programme, *Wordsmith* (Oxford University Press). After that, we classified them following Quirk et al.'s parameters (table 1), grouping the findings into samples of NWs' and NNWs' speech. Although Halliday and Hasan's (1976: 242-3) classification of conjunctive relations is clear and detailed, for the purposes of this study we chose the one by Quirk et al. (1993), as our aim was to distinguish the variations in the use of connectors, not the relations between different conjunctions.

CLASSIFICATION OF CONNECTORS	EXAMPLES
1. Enumerative	for a start, finally
2. Additive	in the same way, likewise

<i>Equitative</i>	moreover, further
<i>Reinforcing</i>	
3. Summative	in sum, altogether
4. Apposition	for example, namely
5. Result	as a result, consequently
6. Inferential	therefore, in that case, otherwise
7. Contrastive	more precisely, rather
Reformulatory	better, again
<i>Replacive</i>	by contrast, instead
<i>Antithetic</i>	in any case, however
<i>Concessive</i>	
8. Transition	by the way, incidentally
Transitional	in the meantime, meanwhile
<i>Temporal transitional</i>	

Table 1. Classification of connectors by Quirk et al. and examples.

In this part of the study, we also suggested our explanations of variation in the use of connectors. Finally, while evaluating the variations observed, we also provided some guidelines for NNWs in the use of connectors.

3. RESULTS

Our results are presented in the table containing the classification of connectors, the number of occurrences of each group and the total number of connectors obtained from the NNWs corpus; the number of the occurrences classified in the different groups and the total from the NWs corpus; and, finally, the proportions of both groups of writers. Within the groups of connectors, the percentage of each group is calculated considering each group as a separate entity in order to obtain individual variation in the use of connectors. At the end, the total of conjunctions and the percentages in each group are calculated.

The findings are presented in table 2:

CLASSIFICATION OF CONNECTORS	NNW OCCURRENCES	NW OCCURRENCES	NNW %	NW %
1. Enumerative	114	382	22.98	77.02
2. Additive	16	235	6.38	93.62
<i>Equitative</i>	353	84	80.77	19.23
<i>Reinforcing</i>				
3. Summative	116	325	26.30	73.70
4. Apposition	12	31	36.36	93.94
5. Result	408	531	43.45	56.55
6. Inferential	109	343	24.11	75.89

7. Contrastive	5	59	7.81	92.19
Reformulatory	180	86	67.66	32.34
<i>Replacive</i>	170	163	51.05	48.95
<i>Antithetic</i>	244	374	39.48	60.52
<i>Concessive</i>				
8. Transition	63	35	64.28	35.72
Transitional	96	127	43.05	56.95
<i>Temporal transitional</i>				
Total	1886	2775	40.52	59.48

Table 2. Results of the use of connectors in the NNWs and NWs corpus.

Examples of the connectors found in the research are shown in the appendix at the end of the article. As can be seen from the table above, the most common connectors are those of result (*consequently, hence, therefore, thus, etc.*) in NNWs and NWs writing, while the least used are the reformulatory ones in NNWs' texts and the apposition connectors in those of NWs. If we look at the different frequencies of connectors in the general classification, the most common is the contrastive type. Despite the observed variation in most of the NWs and NNWs parts of our corpus, both groups of authors use the result and antithetic connectors in a similar way. The equitative, summative and reformulatory connectors are used in quite a different proportion, as NWs use them more than NNWs. On the other hand, the reinforcing connectors are used more by NNWs, but, in general, all the different classes of connectors are more used by NWs.

The total use of connectors is higher (by 19%) in NWs discourse than in that of the NNWs in the total of the corpus. To give examples of the most typical occurrences, we can mention the result connector *so* (219 occurrences in NWs and 176 in NNWs) or the summative or inferential connector *then* (650 occurrences in NWs and 168 in NNWs). *Therefore* (120 occurrences in NWs and NNWs) is used by both groups in the same way, as we found the same number of occurrences. In the case of the concessive connectors, *however* (NWs = 300; NNWs = 151) is the most common among them, it seems to be overused by the authors.

4. CONCLUSIONS

The main aim of the present study is to detect variations in the use of connectors by the two groups, one of them consisting of NNWs and the other of NWs. The term variation is used to describe the differences that we can observe when we compare texts generated by these two groups of writers. These variations can be classified into those that are caused by the influence of the writers' L1 and its culture, and those caused by the writers' poor command of the English language.

Variations caused by the influence of the L1 (Spanish)

With regard to additive connectors, NNWs use fewer equitative connectors while English NWs use fewer reinforcing connectors; these results are caused by a transfer from the mother tongue. In Spanish, the overuse of reinforcing connectors is quite common and there are different words used to confer variation to the expression, meanwhile equitative connectors are underused.

The result connectors are the most common in the texts produced by both groups of writers, due to the specific way of presenting results of scientific writing considered in the present

study. Presumably, these connectors would be used more frequently in different languages, as they are instrumental in expressing the aims of a scientific article.

Contrastive connectors are divided into different classes and offer a variety of expressions, so the writers used them quite frequently compared with the rest of the examples if we consider global categories. The total use of contrastive connectors is less with NNWs (599 occurrences) than with NWs (682 occurrences). Variety in this kind of connectors is not so wide in Spanish, so one can conclude that NN authors are not very familiar with the richness that these connectors can confer to the text, and this is the reason why they are not so frequent. Also, the formality of these connectors implies that they are not so frequently used by NNWs.

Summing up, NNWs tend to apply more of additive, result and contrastive connectors, overusing them, the reason being that these connectors are more familiar to them. On the other hand, apposition connectors are underutilized, being considered repetitive and more informal in Spanish. The influence of L1 is central to the understanding of the frequency of connectors and so, we consider that teachers should emphasize the importance of connectors and practice contrastive exercises that distinguish the connectors used in L1 and in L2.

Variations caused by poor command of the English language

The observed poor use of enumerative connectors by NNWs - their exposition of ideas without connecting them – may be caused by their inadequate knowledge of the necessary linguistic devices. What results from it in the author's failure produce a text that would measure up to the required standards of coherence and cohesion. We consider that NN writers of scientific articles generally know certain basic connectors' meaning and the way they are used, but as their English command is not so good, they cannot be confident users of all the categories of connectors included in this study.

Summative connectors have fewer occurrences in NNWs texts, presumably, as a result of their poor command of the English language. Summative connectors are frequently used in Spanish to conclude sections, but the writers underused them.

Concerning the apposition connectors, their use is not frequent in the texts written by both NWs and NNWs, due to the specific function of these connectors.

Furthermore, the inferential connectors are mainly used by NWs and the low frequency of their occurrences in NNWs' writing causes a decrease in the cohesion of the text. These connectors are used to join internal parts of the sentence and facilitate the reading of scientific texts.

In order to improve NNW authors' command of connectors and eliminate overuse or underuse of some of them, we would recommend that researchers pay attention to large-scale, corpus-based studies on non-native writers' connector usage. These studies should establish the possible causes for certain connector usage patterns.

As pointed out in the introduction and objectives, the essence of the argument of the present paper is to demonstrate that there are important variations between the NWs' and NNWs' use of different kinds of English connectors. As we have seen, there are variations, but they are not noticed by the reader of scientific articles.

The variations identified in this research project have been classified into two groups with the aim to explore their origin and provide information to Spanish writers of scientific articles. Once the NNWs know the different frequency of connectors, they would be able to make informed decisions about the ways to use connecting devices and incorporate those that are underused. However, it should be noted that different frequency of certain connectors is not crucially

important for coherent communication with other researchers, it mainly influences the cohesion of the text.

In the age of globalisation English as the language of international communication allows for increasingly different ways of expression in the exchange of information between people belonging to different cultures and speaking languages other than English. Scientific articles are published in international journals and are evaluated and accepted by reviewers from different parts of the world. If the information transferred is understood by the majority of those involved, the variation is acceptable. In this article, we have proved that NWs and NNWs use conjunctions in different ways, but these variations do not affect the understanding of the true meaning of the texts as they are accepted by the scientific community.

5. BIBLIOGRAPHY

Alcaraz, E. (2000) *El inglés profesional y académico*. Madrid: Alianza editorial.

Biber, D. et al. (1998) *Corpus Linguistics. Investigating Language Structure and Use*. Cambridge: Cambridge University Press.

Brown, G. & Yule G. (1983) *Discourse Analysis*. Cambridge: Cambridge University Press.

Connor, U. (1996) *Contrastive Rhetoric*. Cambridge: Cambridge University Press.

Cortese, G. & P. Riley [eds.] (2002) *Domain-specific English. Textual Practices across Communities and Classrooms*. Berlin: Peter Lang.

Dudley- Evans, T. y St. John, M. J. (1998) *Developments in English for Specific Purposes: A Multidisciplinary Approach*. Cambridge: Cambridge University Press.

Ellis, R. (1994) *The Study of Second Language Acquisition*. Oxford: Oxford University Press.

Ellis, R. (1997) *Second Language Acquisition*. Oxford: Oxford University Press.

Halliday, M. A. K. y Hasan, R. (1976) *Cohesion in English*. London: Longman.

Halliday, M. A. K. (1985) *An Introduction to Functional Grammar*. London: Arnold.

Hunston, S. (1994) "Evaluation and organization in a sample of written academic discourse" in R. M. Coulthard [ed.] *Advances in Written Text Analysis*. London: Routledge: 191- 218.

Hunston, S. and G. Thomson (2000) *Evaluation in Text*. Oxford: Oxford University Press.

Hyland, K. (1996) "Writing without conviction? Hedging in science research articles", *Applied Linguistics*, 17: 433- 454.

Lorenz, G. (1999) "Learning to cohere: casual links in native vs. non-native argumentative writing" in W. Bublitz, U. Lenk and E. Ventola [eds.] *Coherence in Spoken and Written Discourse*. Amsterdam: John Benjamins.

Martin, J. R. (1996) "Beyond exchange: APPRAISAL systems in English" Unpublished mimeo, University of Sydney.

Mauranen, A. (1996) "Discourse competence- Evidence from thematic development in native and non-native texts" en E. Ventola y A. Mauranen [eds.] *Academic Writing. Intercultural and Textual Issues*. Amsterdam: John Benjamins: 195- 230.

McCarthy, M. (1991) *Discourse Analysis for Language Teachers*. Cambridge University Press.

Piqué, J.; Andreu-Besó, J. V. & Viera, D. J. (1996) ‘EAP or ESP? That is NOT the question’ in *English in Specific Settings*. Valencia: Nau Llibres: 5- 8.

Quirk, R. et al. (1972) *A Grammar of Contemporary English*. Londres: Longman.

Quirk, R. y Stein, G. (1993) *English in Use*. Londres: Longman.

Scott, M. (1998) *WordSmith Tools 3.0*. Oxford: Oxford University Press.
<http://www.liv.ac.uk/ms2928/wordsmith.htm>.

Smith, N. y Wilson, D. (1983) *La lingüística moderna*. Barcelona: Editorial Anagrama.

Swan, M. (1995) *Practical English Usage*. Oxford: Oxford University Press. (2nd edition).

Van Lier, L. (1995) *Introducing Language Awareness*. Londres: Penguin English.

White, P. (2001) ‘Appraisal: An overview’ in <http://www.grammatics.com/appraisal>. (17-06-02)

APPENDIX

LIST OF CONNECTORS

Enumerative and additive:

first, second, third, firstly, secondly, thirdly, finally, furthermore, in addition, moreover, lastly, last but not least, to begin with, for another, in the first place, in the second place, similarly, for one thing, for another

Summative:

to sum up, to conclude, in summary, in short, in brief, in conclusion, overall, all in all, altogether

Apposition:

that is, that is to say, in other words, for instance, for example, namely, e.g.(eg), i.e. (ie)

Result:

consequently, hence, therefore, thus, as a result, as a consequence, in consequence,

Inferential:

otherwise, in that case

Contrastive:

however, although, (even) though, on the other hand, instead, after all, on the contrary, in contrast, besides, nevertheless, anyway, still, by contrast, nonetheless, alternatively

Transition:

meanwhile, eventually, subsequently, originally

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