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Mapping the status and functions
of English for research publication
purposes in the biomedical field:
Text-linguistic,
ethnomethodological and
ethnographic perspectives

Departamento
Filología Inglesa y Alemana

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Tesis Doctoral [Extracto]

MAPPING THE STATUS AND FUNCTIONS OF
ENGLISH FOR RESEARCH PUBLICATION
PURPOSES IN THE BIOMEDICAL FIELD: TEXT-
LINGUISTIC, ETHNOMETHODOLOGICAL AND
ETHNOGRAPHIC PERSPECTIVES

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UNIVERSIDAD DE ZARAGOZA

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Tesis Doctoral

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Text-linguistic, ethnomethodological and ethnographic
perspectives

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2017

**To my grandparents, especially to my grandfather Manuel, for their
support and for being a model to follow.**

Love you all,

Arantxa

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I am also indebted to the anonymous researchers for their willingness to collaborate in the interviews that I conducted for this PhD work and for facilitating all the information I requested them in order to achieve my research goals.

Finally, this thesis would have not been possible without my family, uncle, cousins, aunts, nieces and nephews. My parents, my brother and my partner have given me an unconditional support and have always made me feel confident and capable of reaching my objectives.

Last but not least, I should express my gratitude to my friends because they have always been close to me, even if the time I have spent with them over the past few years has been constrained by my commitment to the present PhD project.

Arantxa Ventura Rubio

Zaragoza, 12 September 2017

ABSTRACT

The main aim of this PhD was to contribute to the examination of the role and functions of English as an international scientific language in Spain, and as the world language of scientific communication. It draws on three interrelated methodological approaches: a textual analysis (both at a rhetorical level and at a phraseological level) of texts aiming at disseminating new knowledge; an ethnomethodological analysis of scientists' perceptions and attitudes towards English and towards writing in English as an additional language; and an ethnographic analysis of spaces, materials, and texts deployed by a small community of scientists in order to access, share and disseminate scientific knowledge. It was initially hypothesised that the triangulation of the three datasets would contribute with a multi-perspective view of English for research communication purposes in the biomedical field.

Results support previous EAP work in the field of biomedicine and in other disciplinary domains. The analysis of a specialized corpus compiled for the present study showed that research writing draws on standardized conventions for information organization. Broadly, all the texts analysed adhered to the prototypical macrostructural organization for empirical research articles described by Swales (1990, 2004), although minor variations were also observed with regards the original IMRD Swalesian structure. Turning to writing practices, the interview data provided further evidence, added to those of others, of the spread of English as an international research language and the ensuing language challenges that writing in English as an additional language poses to researchers from non-Anglophone linguacultural backgrounds. Ethnographic observation of the workspaces confirmed that both professional and research-oriented genres are the main means researchers draw upon to access, exchange and disseminate scientific knowledge. I finally conclude with some critical reflections deriving from the triangulation of the three datasets (texts, perceptions of writing practices and contexts in which such practices are carried out) and assess the role and status of English and the multiple factors affecting research writing with a view to providing both pedagogical and lifelong learning orientations.

El objetivo de esta tesis doctoral es el de contribuir a la investigación sobre el papel y las funciones del inglés como lengua científica internacional en el contexto español. Para ello, la tesis toma como punto de referencia tres marcos analíticos interrelacionados: un análisis textual (tanto a nivel retórico como a nivel fraseológico) de textos dirigidos a la difusión del conocimiento científico; un análisis etnometodológico, para indagar en las percepciones y actitudes de los investigadores hacia el inglés y hacia la redacción de textos en inglés como lengua adicional (EAL por sus siglas en inglés), y una aproximación etnográfica del contexto (y de sus espacios físicos y objetos) en el que se genera conocimiento científico, se accede, se intercambia y se difunde dicho conocimiento como parte de las prácticas profesionales. La triangulación de los datos obtenidos a través de esta aproximación múltiple permitirá una mejor comprensión de la naturaleza y de la funcionalidad del inglés para fines de investigación en el ámbito biomédico.

Los resultados obtenidos son consistentes con los de trabajos previos de Inglés para Fines Académicos (EAP por sus siglas en inglés) en el ámbito de la biomedicina. El análisis del corpus especializado revela la utilización de convenciones altamente estandarizadas para la organización de la información a nivel textual. Todos los textos analizados se adhieren a la macroestructura prototípica de los artículos experimentales descrita por Swales (1990, 2004), IMRaD, si bien se observan pequeñas variaciones respecto a esta estructura. En cuanto a las prácticas de escritura, los datos de entrevistas semiestructuradas aportan evidencia a la ya existente, confirmando que el predominio del inglés como lengua científica internacional supone retos y problemas lingüísticos a los investigadores cuya lengua materna no es el inglés. Finalmente, la observación etnográfica de los espacios de trabajo indica que tanto las prácticas profesionales de la cohorte de investigadores que se analiza como los géneros que emplean para acceder, intercambiar y difundir conocimiento científico, dan lugar a una configuración de lenguas académicas bien delimitada. Finalmente, la tesis concluye con unas reflexiones críticas

a partir de la triangulación de los resultados (textos, percepciones sobre prácticas de escritura y contexto de interacción social), que permiten valorar empíricamente, al menos de forma tentativa, el papel y el estatus del inglés como lengua científica y los múltiples factores que determinan las prácticas de escritura académica. A partir de estas reflexiones se aportan unas propuestas pedagógicas y de aprendizaje continuado a lo largo de la vida.

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AIM AND SCOPE OF THE DISSERTATION

1.1 Globalization and knowledge societies

Sociologist A. Giddens (1990) defined 'globalization' as the "intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa" (p. 64). Globalization processes have influenced all sorts of activities worldwide in the so-called knowledge-intensive societies and enhanced cooperation and exchange dynamics across countries worldwide.

The current globalizing processes and the socioeconomic development of knowledge societies, defined by UNESCO (2010) as societies "nurtured by its diversity and its capacities" (p. 17), in many ways account for the current scholarly interest in aspects related to knowledge generation, knowledge exchange and knowledge dissemination (Research Trends, 2012; Royal Society, 2011; UNESCO, 2010). Knowledge is thus the key in the development of knowledge societies. It redresses inequality, exclusion and social conflict. The concept of 'society of knowledge' first emerged in the late 1960s and developed since the early 1970s along with the term "learning societies" and the motto "education for all". It was the academic Peter Drucker who first coined the concept of knowledge society in 1969 but not until the 1990s did this concept gain momentum with the works of Robin Mansell (Mansell, 1998) and Nico Stehr (Stehr, 1994).

The ideas above were further developed in concurrent research on information society. Castells (2004) reports that the introduction of technology in society led to dramatic changes in knowledge societies, as the economy of every knowledge society is based on scientific knowledge. As argued in these studies, educating people is the most remarkable way of becoming producers of knowledge in a given society. Scardamalia and Bereiter (2003, p. 73) maintain that there exists a developmental trajectory leading from the natural inquisitiveness of the young child to the disciplined creativity of the mature knowledge producer. This developmental trajectory is explained along three main approaches:

1. Foundational knowledge, that is, knowledge gained upon completion of graduate school or adult work.
2. Knowledge of subskills such as critical thinking, knowledge of the scientific method, and collaboration skills. This knowledge is gained upon completion of advanced educational levels and is frequently reached by a few.
3. Mature knowledge, gained within learning communities, project-based learning and guided discovery as well as through independent, self-directed learning.

Pozzi (2011) further notes that knowledge is socially constructed and best supported through collaborations designed so that participants share knowledge and tackle projects that incorporate features of adult teamwork, real-world content, and use of varied information sources (p. 147). Table 1.1 summarizes the main differences between traditional learning and lifelong learning in the context of knowledge societies:

Table 1.1

Lifelong learning in the knowledge society (Weert, 2005, p. 19).

TRADITIONAL LEARNING	LIFELONG LEARNING
The teacher is the source of knowledge.	Educators are guides to sources of knowledge.
Learners receive knowledge from the teacher.	People learn by doing.
Learners work by themselves.	People learn in groups and from each other.
Tests are given to prevent progress until students have completely mastered a set of skills and to ration access to further learning.	Assessment is used to guide learning strategies and identify pathways for future learning.
All learners do the same thing.	Educators develop individualized learning plans.
Teachers receive initial training plus ad hoc in-service training.	Educators are lifelong learners. Initial training and on-going professional development are linked.
'Good' learners are identified and permitted to continue their education.	People have access to learning opportunities over a lifetime.

Within the dynamics of knowledge societies a shared language for scientific knowledge production, exchange and dissemination becomes a necessity (Curry & Lillis, 2004, 2010; Lillis & Curry, 2010; Pérez-Llantada, 2012). Authors like David Graddol (2006) or

key linguist David Crystal (2003), among others, have provided a comprehensive view of the impact of the spread of English as the shared language for worldwide scientific knowledge communication. Their works underline the fact that English is used by both native and non-native English speakers, the latter being the great majority (a ratio of 1 to 4).

Over the past decades, the debate around the spread of English in academic and research settings has addressed reported language-related problems faced by semi-periphery communities of scholars, that is, communities of non-native English-speaking scientists who use English as an Additional Language (EAL heretofore) for research communication purposes. Broadly, it has been argued that these scholars very often face a number of linguistic challenges when communicating in EAL (Bennett, 2011, 2014; Flowerdew, 1999, 2000, 2001, 2008; Canagarajah, 2002; Cheung, 2010; Englander, 2013; Englander & Uzuner, 2013; Ferguson, 2007; Pérez-Llantada & Plo, 2011; Pérez-Llantada, Plo & Ferguson, 2011; Plo Alastrue & Pérez-Llantada, 2015, among others). This PhD will take an in-depth look into one of these communities of EAL writers in the Spanish context.

1.2 Scientific knowledge production and dissemination

In the context of academia, Spanish research output production has been at the forefront of scientific knowledge production and dissemination, scoring not unremarkable figures of scientific publications, articles, reviews and conference presentation over the past decade, as shown in Figure 1.1.

Producción científica en España (2004-2014)

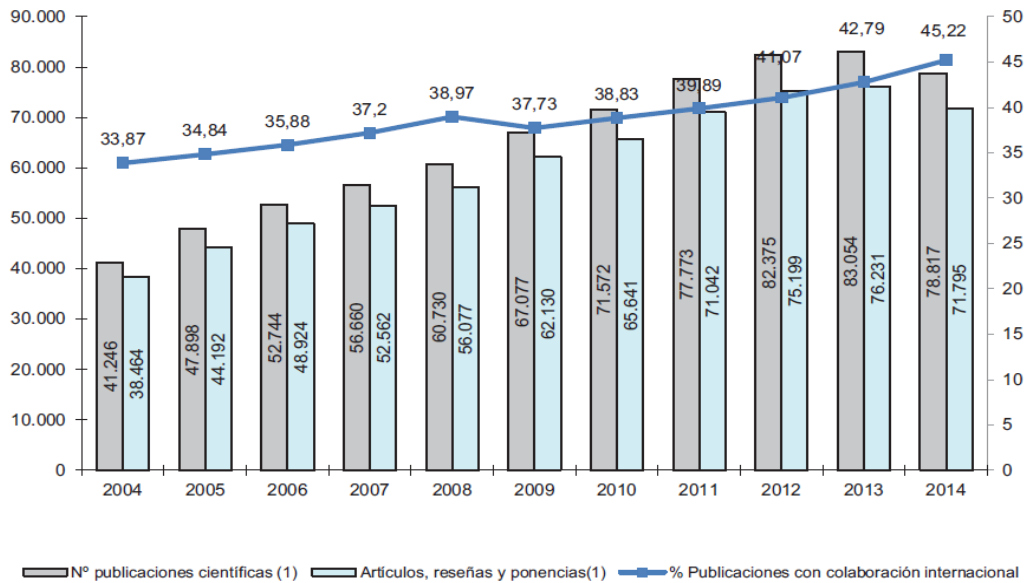


Figure 1.1

Producción científica en España (2004-2014) (Source: Ministerio de Educación, Cultura y Deporte. Datos y cifras del sistema universitario español. Curso 2015-2016).

FECYT (the Spanish Foundation for Science and Technology), through ICONO, the Spanish R&D+i Observatory, is the institution in charge of tracking scientific knowledge production in the Spanish context. According to the latest scientific production indicators published by ranks, Spain is among the top ten countries for scientific output¹. It is also worth noting, given the scope of this dissertation, that a total of 77,000 scientific papers were published in 2014 (amounting to 3.2% of all science articles published worldwide). In other words, Spain holds the tenth position in the global rank. FECYT website further highlights the increasing collaboration of Spanish researchers with researchers from other countries.

¹ <<http://marcaespana.es/en/news/we-are/spain-among-worlds-top-10-countries-scientific-production>>

Since 2005, the number of science articles has risen by 41%, and the quality and impact of Spanish science publications have been growing as well. The relative impact of Spanish research is shown by percentage of most cited publications, which went up by almost one per cent in a year's time – from 12.9% in 2013 to 13.7% in 2014. Furthermore, its global scientific impact increased to 1.31% from 1.30% in the same period.

The number of highly cited articles whose first author is a Spaniard rose from 8.4% in 2013 to 9.0% the following year. Papers written by authors from Spain and third countries went up by 1.2% to 44.7% in 2014.

It is also worth commenting that, across scientific fields, out of all papers published, the highest number corresponds to the papers in the field of Medicine (25,363 papers). These are followed by papers published in Engineering (11,621), Biochemistry, Molecular Biology and Genetics (9,932), Physics and Astronomy (9,738) and Computer Science (9,504). Another interesting figure that can best situate the rationale of the present PhD work is the scientific production of the region of Aragon. According to FECYT, a total of 1,779 documents were recorded in Aragon in 2014 (Figure 1.2).

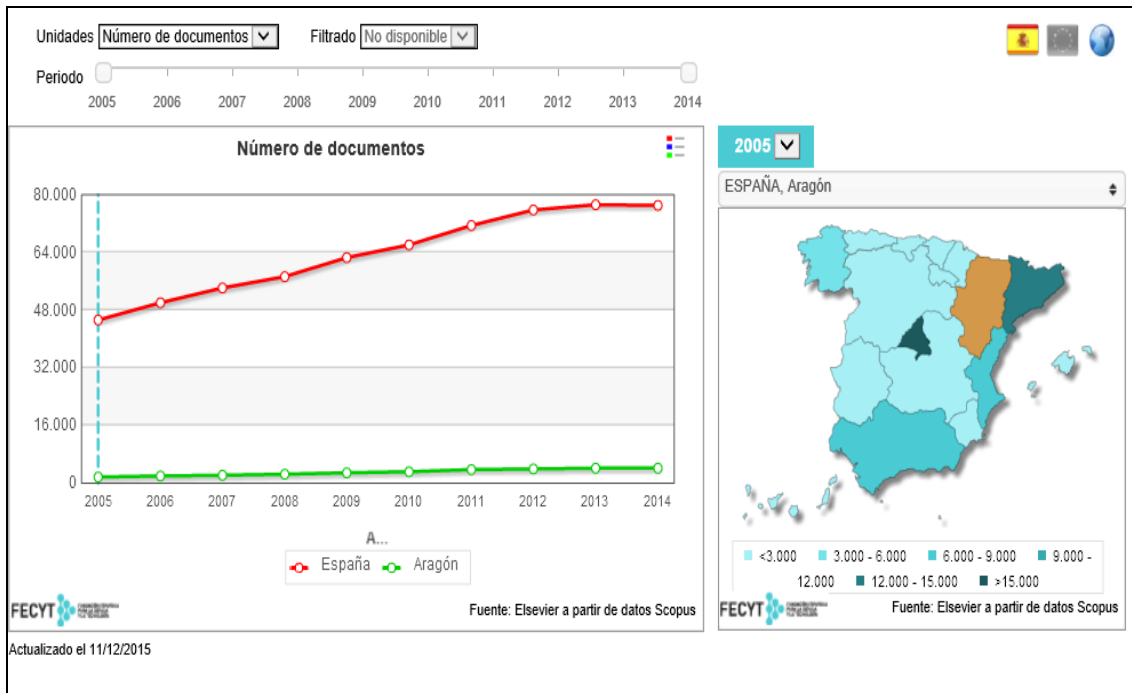


Figure 1.2

Scientific production in Aragón (Source: ICONO

<https://icono.fecyt.es/indicadores/Paginas/default.aspx?ind=98&idPanel=1>)

The distribution of scientific production in Spain across areas of knowledge shows that the fields of medicine and sciences represent the highest research output (Figure 1.3):

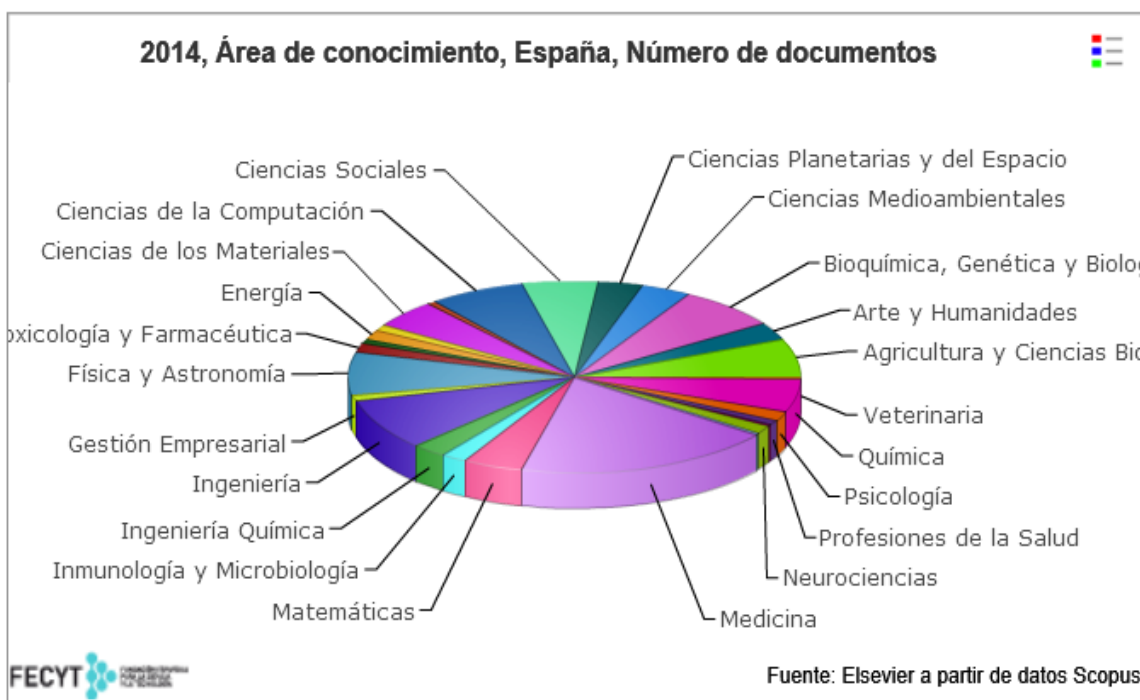


Figure 1.3

Knowledge areas in Spain (Source:

<https://icono.fecyt.es/indicadores/Paginas/default.aspx?ind=198&idPanel=1>).

The number and distribution of all publications in the areas investigated in this PhD is shown in the following figures:

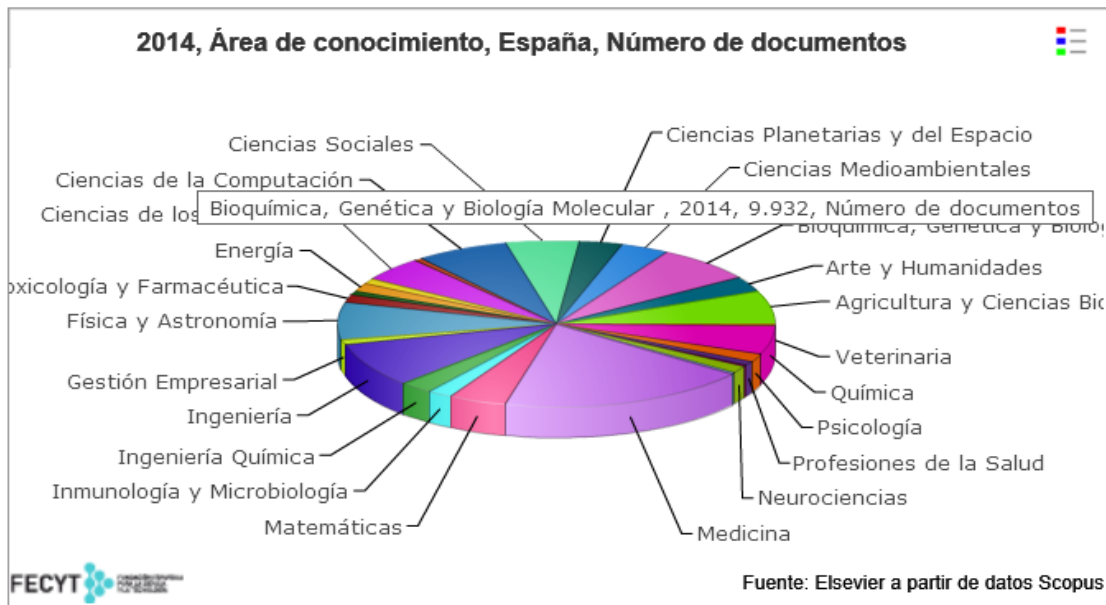


Figure 1.4

Knowledge production in the field of biochemistry, genetics and molecular biology (Source: <https://icono.fecyt.es/indicadores/Paginas/default.aspx?ind=198&idPanel=1>).

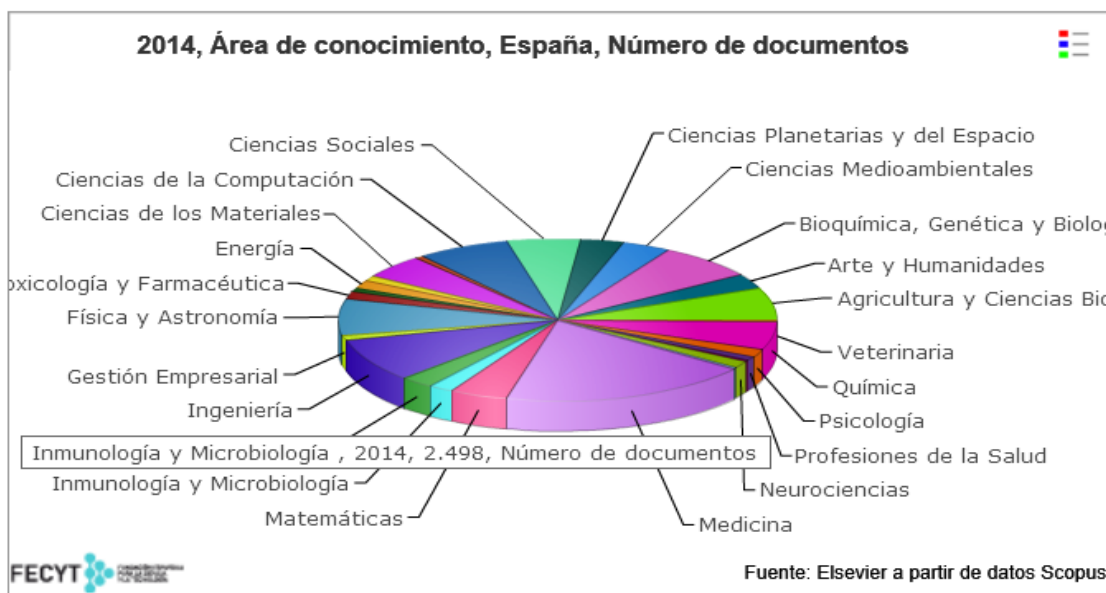


Figure 1.5

Knowledge production in the field of immunology and microbiology (Source: <https://icono.fecyt.es/indicadores/Paginas/default.aspx?ind=198&idPanel=1>).

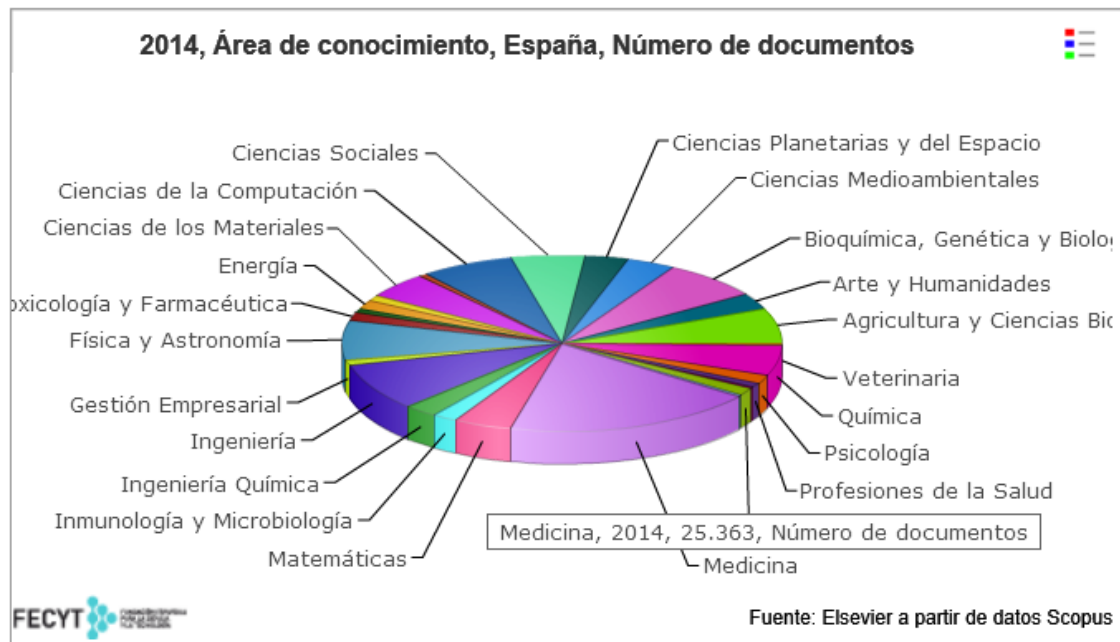


Figure 1.6

Knowledge production in the field of medicine (Source:

<<https://icono.fecyt.es/indicadores/Paginas/default.aspx?ind=198&idPanel=1>>).

It is precisely in this context of knowledge sharing and knowledge dissemination worldwide that this PhD aims to contribute to a better understanding of the role and functions of English for international scientific communication in Spain, a geographic location worth investigating considering the high biomedical research output production of the country. I specifically sought to examine the case of biomedical research knowledge production, exchange and dissemination and contribute to ongoing research carried out by the InterLAE research group (*Interpersonality in Academic Written Discourse*) and support some of the thematic strands of their recently completed and current research projects “El inglés como lengua franca en los discursos especializados: espacios alternativos de producción lingüística y cultural a través del análisis crítico de género” (Plan Nacional I+D+i project code FFI2012-37346) and “Ecología de géneros y ecología de lenguas: análisis de las dinámicas de la

comunicación científica local, transnacional e internacional” (Plan Nacional I+D+i project code FFI2015-68638-R). More broadly, it is also my aim to contribute with additional empirical evidence as well as with critical reflections on the contemporary use of the English language in the global context of scientific research communication. The two international research networks that InterLAE, the research group at the University of Zaragoza I have been involved with over the past few years, the English in Europe: Opportunity or Threat? Project (<<http://englishineurope.group.shef.ac.uk/>>) and “The Worldwide Challenge of English” (<<http://www.sheffield.ac.uk/linguistics/wun>>) and its deriving publications have been useful sources of inspiration for designing and developing this PhD.

To fulfil the above-mentioned aims, this PhD drew on three interrelated methodological approaches. The first one was a text-linguistic approach, involving the analysis (both at a rhetorical level and at a phraseological level) of texts aiming at disseminating new knowledge. The second approach was an ethnomethodological study with a small cohort of scientists with which I sought to understand their perceptions of English as a scientific and research language and their attitudes towards research writing practices in English. The third approach was an ethnographic observation of the physical context (spaces and materials) in which texts are accessed and created as part of the scientists’ their everyday professional practices. To interpret the data that I gathered from these complementary methodologies I drew on the theoretical frameworks of genre analysis, second language writing, English for Academic Purposes and academic literacies (Bazerman, 1994, 2004; Bazerman & Prior, 2004; Berkenkotter & Huckin, 1995; Lillis, 2008; Mauranen, 1993; Maybin, 2000; Maybin & Tusting, 2011; Seloni, 2012; Swales, 1990, 2004; Tribble & Wingate, 2013; Wingate, 2012, among others). In exploring both texts, contexts and practices I aimed to triangulate the three data sources and approaches and provide a critical view of English for research communication in the context of biomedical communication.

1.3 English as an International Language and Academic Englishes

Since the beginning of human existence, language has become a necessity for communication. Barber (1982, p. 3) stated that language is an “indispensable and universal component of the cultural system of all societies”. It does not matter whether the language used to communicate scientific knowledge is English, Spanish or any other. Over the last decades, English has certainly become the most widely used language among non-native English speakers worldwide in the context of scientific communication. Indeed, many authors have studied this language/communication phenomenon and almost all of them have reached the same conclusions. First, non-native English-speaking researchers nowadays far outnumber their native-English speaking counterparts. Secondly, due to its widespread use, English has become the world’s international language of science (Kachru, 2006, 2008; Swales, 2004). Beneke (1991) succinctly summarizes this double-fold view by noting that “about 80 per cent of verbal exchanges in which English is used as a second or foreign language do not involve native speakers of English” (p. 54).

In noting the widespread use of English nowadays McKay (2002) defines the concept of International English as follows:

International English is used by native speakers of English and bilingual users of English for cross-cultural communication. International English can be used both in a local sense between speakers of diverse cultures and languages within one country and in a global sense between speakers from different countries. (p. 132)

This author further stresses the mainstream idea that there are two kinds of English users, those whose mother tongue is English (labelled 'EMT users') and those whose mother tongues are languages other than English. By developing the well-known theory of "English Concentric Circles", Kachru (2006, 2008, 2009) conceptualizes English as a World Language that is being distributed in three different circles: the Inner Circle, the Outer Circle and the Expanding Circle. The Inner Circle refers to English-speaking countries such as the USA, the UK, Ireland, Canada, Australia and New Zealand. In the Outer Circle countries, the use of the English language is part of the post-colonial legacy. This circle includes geographic areas in which the local language of the area and the use of English at a national and an institutional level for international communication coexist. This is the case of countries such as India, Jamaica, Malaysia, Nigeria, the Philippines or Singapore, to name a few. Finally, those countries where English is taught as a foreign language are included in the English Expanding Circle. China, Egypt, Indonesia, Israel, Japan, Korea, Saudi Arabia or Taiwan, among others, are included in this circle. Spain is also an expanding circle country in Kachruvian terms. Considering the impact of globalizing processes, English as an International Language can be equated to the dominance and role of Latin in ancient times.

Along similar lines, Crystal (2003) explains that while English in the Inner Circle is used by 380 million speakers (first language) and Outer Circle varieties are used by 150 to 300 million speakers, an estimated range from one hundred million to one billion speakers in the Expanding Circle use English as a foreign language. This author underlines that the value of Kachru's concentric circles model is that it "captures the historical, sociolinguistic, inquisitional, and literary contexts of the spread and diffusion of English" (p. 529). In the 1980s, the scholarly debate on English mainly focused on the native-English speaker vs. the non-native English speaker' dichotomy, and English as a Native Language (ENL) represented the dominant variety, the one used by native-

English speakers born in countries where English is the first/national language. Gradually, the influential theoretical and educational strands of English as a Second Language (ESL) and English as a Foreign Language (EFL) further supported the spreading of English as an International Language (EIL) across domains. In Halliday, Macintosh and Stevens' (1964) words, the global scenario was depicted as follows:

English is no longer the possession of the British, or even the British and the Americans, but an international language which increasing numbers of people adopt for at least some of their purposes [...] in an increasingly large number of different varieties.

The worldness of English, in both its global and local scope, implies relationships to the larger world and to the local context different from those of other languages. Given the dominant position of English in the world and its connections both to inequitable economic systems and to the dominance of certain forms of culture and knowledge, there are inevitable questions to be asked here concerning language and inequality. (p. 293)

According to the EAP literature, the specific linguacultural background of the L2 writers is an important aspect to bear in mind, as it has been empirically attested that certain features of the national language are transferred to second (English) language usage. The outcome of this phenomenon is what the work of Braj Kachru (2006, p. 234) and Yamuna Kachru and Smith (2008) define as 'Englishes' in the plural form, also conceptualized as 'varieties of English', 'international Englishes', 'new Englishes', 'English languages' and 'World Englishes'. As Kachru and Smith state, "[we] do not believe there is a variety called world English, international English, or global English"

(p. 3). In the context of academia, Mauranen, Pérez-Llantada and Swales (2010) coin the term 'academic Englishes' (authors' own emphasis added) to refer to a similar linguistic phenomenon in written academic discourse.

The advancement and prevalence of English for international communication in academic contexts has also been an extensively debated scholarly issue over the past decades. Phillipson (1992) coined the term 'linguistic imperialism' to refer to the negative impact of the advancement of English in English semi-peripheral countries. I turn to this specific issue in greater detail in the following section.

1.4 Englishes, globalization and Lingua Franca

Issues of Englishes, globalization and, above all, English as a lingua franca have yielded rich linguistic scholarly work over the past decades, as can be attested by the high number of publications that can be found in EAP-related journals such as *Journal of English for Academic Purposes*, *English for Specific Purposes Journal*, the *Journal of Second Language Writing* and the *Journal of English as a Lingua Franca*, *inter alia*. In the late 1990s, Dogançay-Aktuna (1998) explained the reasons why the spread of English took place as follows:

As a result of socio-political and economic events, English began to spread in the non-colonised areas of the world after World War II via careful language planning. It gradually replaced French as the language of international diplomacy to become the lingua franca for trade, banking, tourism, popular media, science and technology. In order to gain access to

these information networks, English was integrated into the education systems of many countries, even in officially monolingual areas, e.g. in the Middle East, Far East, and many European Nations. (p. 25)

At present, English has become the fundamental communication means in across domains of language use. Tsui and Tollefson (2007) explain that “globalization is effected by two inseparable mediation tools, technology and English; and to respond to the rapid changes brought about by globalization, all countries have been trying to ensure that they are adequately equipped with these two skills” (p. 1).

If we turn to the specific context of English for Research Publication Purposes (ERPP heretofore), there seems to be little dispute that plurilingual writers in Europe have been affected by the “Englishization trend” (Swales, 2004, p. 52). It has been consistently argued that these writers disseminate their research mainly in English and, as a result, they do no longer publish in their mother tongues or local languages (Lillis & Curry, 2006; Curry & Lillis, 2010) – a worldwide phenomenon both in Europe and elsewhere (cf. research from Scandinavia by Ljöslund, 2007; Sweden, in Bolton & Kuteeva, 2012; Portugal, in Bennett, 2009; Spain, Pérez-Llantada, 2007, 2012; Pérez-Llantada, Plo, & Ferguson, 2011; or Romania, as in Bardi & Muresan, 2014; Muresan & Nicolae, 2015). The advancement of English has been most deeply felt in geographic areas such as the Netherlands, Italy and Russia, and not so much in geographic locations such as Germany, France and Spain, possibly due to the statuses of the German, French and Spanish languages.

It is also worth noting at this point that the phenomenon of Englishization has not taken place across the different academic disciplinary fields in a similar way. The technical and the natural sciences fields have been mostly involved in the Englishization trend as English has been the language of scientific exchange and publication over the past

decades. In the humanities and the social sciences fields, even if English appears to be gradually becoming the main medium of research communication, research has generally tended to be carried out in the scholars' local language (i.e. in the scholars' L1s) (see e.g. Ammon, 2001; Hamel, 2007), and hence the English-only trend is not so marked.

In discussing reasons for the advancement of English as an international language, Grabe (1988) observed that the spread of English over the last 20 years was, in large part, "the result of the need or desire for *information access*, technology transfer, and economic development" (p. 63; my emphasis added). Concern towards what has been coined as the 'English-linguistic imperialism' rose in 1970s and ever since many scholars have been critical towards the fact that the dominance of English is not accidental, but the outcome of geopolitical and economic interests (Kachru, 2006, 2009; Phillipson, 1992). For Holborow (1992), "the spread of English remains inextricably interwoven with its economic and social origins" (p. 358). For Crystal (1997), English "was at the right place at the right time" (cited in Phillipson, 1992, p. 105).

Rather than being critical towards the 'English-linguistic imperialism' phenomenon, Pennycook (2007) interestingly labels the spreading of English as 'Discourse Imperialism', 'English in the world', and 'the world in English'. For Pennycook, Phillipson's point of view recalls the idea of the expansion of a Discourse written in English by mainly white and west men, which assures the supremacy of certain countries over others (for further discussion see also Bennett, 2009). Pennycook (2007) argues that English ought to be viewed as "the language of international capitalism" (p. 43), used to obtain any benefit and by no means focused on issues of power and discrimination.

A lingua franca is defined as “a language shared by speakers of different mother tongues which they use to facilitate communication between them” (Schluer, 2014, p. 235). In 1953, UNESCO defined lingua franca as “a language which is used habitually by people whose mother tongues are different in order to facilitate communication between them” (Meierkord, 2006, p. 479), see also Brutt-Griffler, 1998, 2002). Succinctly put, English today is global, insofar as it supports communication between multilingual speakers. At present, most users of English are non-native, bilingual or multilingual speakers that draw on the English language as a link to communicate. In Crystal's (2003) words:

A language achieves a genuinely global status when it develops a special role that is recognized in every country. This might seem like stating the obvious, but it is not, for the notion of ‘special role’ has many facets. Such a role will be most evident in countries where large numbers of the people speak the language. (p. 3)

The principal role of a lingua franca is to connect speakers whose mother tongue is different. In its origins, lingua franca was never considered a literary medium, just a spoken one. Nowadays, the concept refers both to spoken and written communication (Jenkins, 2003). EIL, along with ‘English as a global language’ (e.g. Crystal, 2003; Gnutzmann et al., 2015), ‘English as a world language’ (e.g. Mair, 2003) and ‘World English’ (House, 2003; Jenkins, 2007; Seidlhofer, 2011). English at present is being used for international communication and as a working language. Graddol (2006) lists the twelve major international domains in which English is used. Three of them relate directly to the research goals of this dissertation:

1. working language of international organizations and conferences;
2. scientific publications;
3. international banking, economic affairs and trade
4. advertising for global brands
5. audio-visual cultural products (e.g. film, TV, popular music)+
6. international tourism
7. tertiary education;
8. international safety (e.g. 'airspeak', 'seaspeak')
9. international law
10. as a 'relay language' in interpretation and translation
11. technology transfer
12. Internet communication.

In the case of scientific and research communication, English is the main means for worldwide knowledge sharing, exchange, publication and dissemination worldwide. For this reason, the non-native English speakers are in need of improving their skills in the language and become competent communicators. Obviously, it is laborious to determine when a non-native speaker is able to produce English in a proficient way. Widdowson (1993) remarked that a truly proficient English speaker must be able to consider himself/herself, the owner of English and have a perfect knowledge of it. In this author's words,

Real proficiency is when you are able to take possession of the language and turn it to your advantage. This is what mastery means. So in a way, proficiency only comes with non-conformity, when you take the initiative and strike out on your own. [...] English is called upon to carry the weight of all kinds of experience, much of it very remote indeed from its ancestral home. (p. 385)

1.5 English as the language of science

It is a well-documented fact that the dissemination of scientific knowledge research at an international level is mainly conducted in English. Crystal (2003) explains that the importance of English as the language of scientific communication and publication comes from the Industrial Revolution. According to this well-known linguist, two thirds of the scientists at that moment used their mother tongue (English). The scholarly literature to date reflects a changing landscape compared to the early times. The following quotes provide further evidence of this claim:

[...] in the second half of the twentieth century English emerged as the predominant lingua franca in medicine. (Mesthrie, 2001, p. 257)

English has become the official language of the business and scientific world. (Schütz, 2005, p. 145)

Today, English is recognized as undoubtedly the most important language to learn for the increasingly mobile international community. This is a fact that seems to be irreversible. (Genç & Bada, 2010, p. 145)

Agbedo and Eze (2012) refer to Englishization by noting that “[t]he spread of English as the lingua franca of the information age is viewed as the linguistic counterpart to the process of economic globalization”. According to Dor (2004), “the process of globalization undoubtedly has far-reaching linguistic consequences” (p. 97). But these consequences, as the writer claims, “have less to do with the spread of English and the reduction of linguistic variability as such and much more to do with the general social function of language and the relationships among languages, speakers, nation-states, and the global market” (p. 98).

In academic and research settings, Swales (1990) explains that “[t]he need to communicate research results and make one’s research known beyond one’s own immediate environment” (p. 47) has fuelled the advancement of English for research communication purposes. Similar affirmations have later been made under the motto ‘publish in English or perish’ (Ammon, 2001). Yet, the ‘publish in English or perish’ dilemma does not apply similarly to all fields of research. It depends on the construction of knowledge in each discipline (Becher & Trowler, 2001) as well as on the scope of the internationalization of scientific knowledge dissemination specific to a given disciplinary field.

Knowledge exchange is the underlying pillar to understand the use of English as an additional language and the subsequent ‘publish in English or perish’ scholarly debate raised as a result of such use. For some scholars, the use of the mother tongue enables scientists convey nuances of meaning, but this is not the case when English is used as an additional language (Bennett, 2009). Yet, others maintain that scientific

knowledge can be shared, exchanged and disseminated in any language with no loss of meaning. It is claimed, for instance, that when researchers in the biomedical field write experimental papers in English, they use standardized language and information organization conventions, known as the Vancouver protocol.

The Vancouver protocol establishes several uniform requirements for manuscripts submitted to biomedical journals and was devised by the International Committee of Medical Journal Editors to establish guidelines for formatting manuscripts submitted to journals in this particular field of knowledge (<http://www.research.mq.edu.au/documents/policies/Vancouver.pdf>). Publishing in English is a common practice in the natural and technical sciences, mostly motivated by the growing importance of sharing and disseminating biomedical advancements on a global scale. Englander (2013) summarizes why publishing internationally is a fundamental activity for researchers and scholars today:

Publishing research papers in international scholarly journals has increasingly become the most important benchmark of faculty worth and, in a number of disciplines, a requirement of doctoral program completion. The publication made in prestige journals suppose a recognition that is extended in three scales: the scholar, the university in which he or she studies or works and finally to the country where this university is placed. This prestige acquired is rated by rankings in which these institutions participate. This has led to frequent notion of publishing in English prestigious journals a great number of articles not only to disseminate the scholar knowledge and his or her new findings but also to reach a higher level of national or institutional prestige. (p. 1)

Publishing research in English-language journals extends well beyond Anglophone countries to global scholars and institutions across Europe, Asia, Africa, and Latin America, where English is the language shared by multilingual scholars (Englander, 2013). It is further argued that the scholars that disseminate their research in English have to face two difficulties, firstly, the difficulty of producing relevant scientific data and, secondly, the difficulty of publishing in a language that is not one's mother tongue and, hence, meeting the English language expectations of (presumably, native-English) journal editors.

In the contemporary landscape of scientific knowledge exchange, English is considered the undeniable lingua franca shared by the global scientific community. Circa 80% of the journals included in Scopus are published in English (Lillis & Curry, 2010). Further evidence can be found in Subedi's (2010) report, stating that in Japan English has become the language of science, which has led to the disappearance of scientific publications in Japanese. This author explains that one of the most relevant research groups in Japan, Riken, has recently claimed that its researchers have published around 2,000 research articles in English in 2005 and only 174 in Japanese (Subedi, 2010) and that the publication of scientific articles reflects the researchers' interest in being recognized by the international scientific community. A completely different stance towards the use of languages for publication has been reported in an Australian university with a highly multicultural and multilingual staff, the University of Sydney (in the year 2000 up to thirty-four languages reported, according to Subedi, p. 154). This university, which publishes about three per cent of the world's published research, allows staff to publish and spread their knowledge through the publication of scientific articles in many languages to cover the interests of its multicultural scientific community.

The reason for the rise of English as the language of scientific research production, technology, industrialization, international business, transportation and world-wide

communication is a fact. Crystal (2003) remarks that in the late 1990s, such rise was strongly influenced by social, historical and political factors. Other scholars such as Kaplan and Baldauf (1997) maintain that it is more closely related to economic and scientific interests. In early times, before English became the dominant language of science, other languages were used for research publication purposes.

Grabe (1988) noted that the majority of the fields of scientific research are published in English but their authors usually preferred to cite their own articles in their L1 rather than in English (L2). Tsou (1998, p. 520) reported that, in the case of China, the political reality dictated the language of publication. Accordingly, it was more important to be published in the People's daily rather than in the prestigious scientific journals *Nature* or *Science*. Researchers thus preferred to publish in national journals rather than in English. This situation, however, changed dramatically. At the beginning of the 20th century, geopolitical changes worldwide favoured the use of French, German, Russian and English as the main research languages used. German was the dominant language of publication from 1900-1920 and predominant in the fields of medicine, biology, chemistry. Scientific German was taken up by scientific English as a result of the non-native English-speaking scholars' interest in reaching the global scientific community and, in the past decades, as a result of research policies exerting pressure to publish in high impact factor English-medium journals (Canagarajah, 2002; Curry & Lillis, 2004; Lillis & Curry, 2010).

The Oxford English Dictionary defines impact as “[a] marked influence of effect” and this is precisely what may explain the shift to English, recognition (Englander, 2013). In science, producing and disseminating new knowledge has become a quantifiable quality indicator and is measured by taking into account the ‘impact factor’ of each scientific journal. The system of determining the impact of a journal was created in 1961 by Eugene Garfield, founder of the Institute for Scientific Information (ISI) (Englander, 2013, p. 5). The importance of publishing in English changes from field to

field, indeed, the journals published by the SCI, (3,300) do not reflect the general place that English has among the 70,000 scientific journals published worldwide.

In this English-only context, the scholarly literature has reported the linguistic disadvantages felt by the non-native speakers who need, want or wish to disseminate their research in English (see e.g. Ammon, 2007; Belcher, 2006; Canagarajah, 2002; Ferguson, 2007; Flowerdew, 2000, 2001, 2008; Lillis & Curry, 2010; Salager-Meyer, Alcaraz Ariza & Zambrano, 2003; Uzuner, 2008). Flowerdew (2008) remarks that non-native English scholars have to face a great difficulty in achieving publication because of language difficulties due to the “impenetrability of academic writing which takes place between L1 and EAL writers” (p. 21). Ferguson (2007) further raises concern towards the communicative inequality and incipient global diglossia that the English-only trend poses to non-Anglophone scholars today (p. 15).

The 2008 special issue of the *Journal of English for Academic Purposes* was entirely devoted to the theme of English for Research Publication Purposes (ERPP). The common concern of all the contributions was the linguistic disadvantage compared to the linguistic advantage of the native English speakers, particularly felt by scholars in the ‘periphery’. Uzuner (2008) refers to such disadvantage as “time consuming, tedious, and difficult”, “a lengthy and complex endeavour that becomes even more cumbersome when done in a second language” (p. 256). Belcher (2006) likewise describes the process of submitting research for journal publication as “a high stakes game upon which hiring, promotion and continued employment can depend” (p. 1).

Indeed, some of the most influential studies on the linguistic challenges resulting from the widespread use of ERPP can be found in studies from countries worldwide, such as China (Li & Flowerdew, 2009), Denmark (Petersen & Shaw, 2002), Portugal (Bennett, 2010), Spain (Ferguson et al., 2011; Pérez-Llantada, 2012; Pérez-Llantada et al., 2011) or Sweden (Bolton & Kuteeva, 2012), to cite a few. A look at Scopus enables

us to realize that between 1996 and 2011 the use of English-medium publications has increased considerably, especially in countries such as Netherlands, Italy and Russia (Fig. 1). In other countries like Germany, France and Spain, the trend is not yet so remarkable, but is still on the increase.

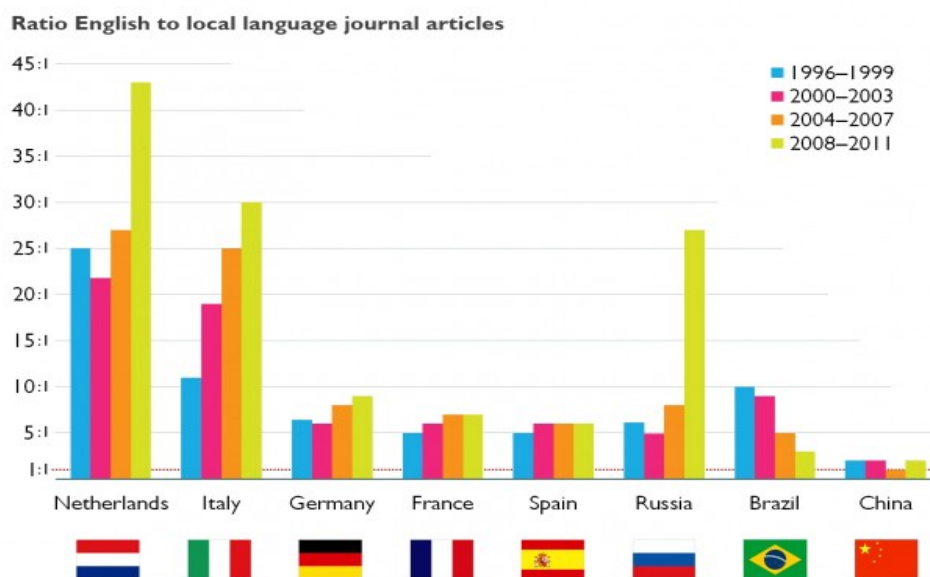


Figure 1.7

Number of journals published in English in eight countries whose mother-tongue is in any case English. (Van Weijen, 2012, pp. 7-8).

Yet, as noted earlier, academic languages other than English are also used in academia, even if such multilingual usage reflects variation across the disciplinary spectrum. For instance, Van Weijen (2012) concludes that researchers who publish in English, Russian or Chinese belong to the hard sciences (such as life science or physical science). Languages such as Dutch, French, Italian, Portuguese or Spanish are used in the soft sciences disciplines (for further discussion on aspects of language use see Pérez-Llantada, 2015).

Table 1.2

Percentage of articles published from 1996-2011 and language used (Van Weijen, 2012, pp. 7-8).

Language	Life Sciences	Physical Sciences	Health Sciences	Social Sciences, Arts & Humanities	Multi-disciplinary & undefined
English	23.4	44.7	19.5	10.7	1.7
Chinese	8.7	72.5	13.0	2.9	2.9
Dutch	14.9	3.2	52.3	26.1	3.5
French	8.6	16.3	36.4	36.5	2.3
German	7.3	34.5	32.5	23.5	2.2
Italian	4.7	12.1	38.6	40.6	4.0
Portuguese	26.1	11.5	38.4	22.1	1.9
Russian	17.2	45.0	21.0	8.4	8.4
Spanish	10.8	13.2	44.4	29.6	2.0

The mainstream trend towards 'English-only' research publication has turned English today into the undisputed lingua franca for knowledge sharing and knowledge exchange. English is "the language of the most prestigious international conferences and journals, and increasingly the medium of higher-level instruction in universities across the world" (Bennett, 2013, p. 169). Also, English has been defined as the premier vehicle for "communication of scholarship, research and advanced post-graduate training" (Mauranen, Pérez-Llantada & Swales, 2010, p. 634) and as "the main lingua franca for research networking and scientific communication" among scholars from different cultural contexts and different L1 backgrounds (Pérez-Llantada, 2012, p. 2).

But even if writing for publication in multilingual contexts poses several linguistic challenges to multilingual scholars, not all the studies report that scholars across geographic locations in Europe (e.g. Germany, Sweden and Romania, *inter alia*) do not feel specially disadvantaged or 'stigmatized' (Flowerdew, 2008) because of their non-native status (see, e.g. Gnutzmann, Jackish & Rabe, 2015; Muresan & Pérez-Llantada, 2014). Publishing in one's mother tongue for knowledge dissemination purpose at a local level is viewed as a comfortable process. However, publishing in English as an additional language is described as an additional effort, but worth the effort, in the sense that it guarantees accessibility to the international scientific community and recognition, among other reasons. In reporting the case of Polish academics, Duszak and Lewkowicz (2008) conclude that choice of language is a determining factor among non-Anglophone academics today:

There is little doubt that the use of English for international communication can facilitate networking and the exchange of ideas among academics. Yet, the choice of which language to publish in is often not a straightforward

one. On one hand, publishing in English is a way to gain international recognition. On the other, non-native speakers may face numerous linguistic, formal, organizational and ideological barriers which may influence their decision to look to the local market for publishing opportunities. (p. 109)

It is thus worth furthering the investigation on the scope of this apparent contradiction in relation to English for Research Publication Purposes.

1.6 Rationale and aim of this PhD study

As mentioned previously, the hegemony of English as a lingua franca for the exchange, dissemination and publication of scientific research has been mainly attributed to the contemporary socio-economic dynamics and to the broader ongoing processes of globalization. In turn, the latter processes have favoured international collaboration for the socio-economic development of knowledge societies defined earlier in this introductory chapter (Crystal, 2003; UNESCO, 2010; Royal Society, 2011; Research Trends, 2012). Concomitantly, such processes have led to decision-making of linguistic policy and internationalization policy at both national and institutional levels (Englander & Uzuner, 2013). Therefore, I deemed it of interest to further contribute to the critical evaluation of the impact of the English language in biomedical communication, and to specifically investigate the idiosyncrasies of a local community of researchers in the Spanish context with a view to comparing it with the use of ERPP in similar localized research communities of practice elsewhere. I also deemed it of interest to triangulate insights into writing practices with the researchers' attitudes and perceptions towards

English and with an ethnographic description of the actual site where research languages are used and form the 'language ecology' (Mühlhäusler, 1996, 2003; Spinuzzi, 2003, 2004) of the site where the researchers develop their professional practice.

From a theoretical standpoint, the goals of the present PhD was to explore the nature of English in research communication (Chapter 3, on the use of English writing conventions that the community of researchers investigated draws on to draft their own papers), assess the attitudes and perceptions of these researchers regarding the dominance of English for international communication at the expense of use of their national language (Chapter 4, on attitudes and perceptions towards English as an international language of research) and, finally, explore how Spanish, as the local language, English and other research languages are used and what communicative purposes they perform (Chapter 5, an ethnographic approach to research publication practices). As stated previously in this Introduction, the broad theoretical and analytical frameworks employed to attain these goals included genre analysis and English for Academic Purposes (Swales, 1990, 2004; Pérez-Llantada & Swales, 2017), ethnomethodology and ethnography (Barton, 2007; Tusting & Barton, 2016). These perspectives inspired the title of this PhD, "Mapping the status and functions of English for research publication purposes: text-linguistic, ethnomethodological and ethnographic perspectives". To the best of my knowledge, no PhD study in the Spanish context to date has triangulated data sources retrieved from the three approaches, hence the interest in exploring the complementarity in the three analytical approaches. The scope of the present PhD work is sketched out below.

Studies on research genres over the past decade have investigated the use of English as the language of international scientific communication (Canagarajah, 2002; Mauranen, Pérez-Llantada & Swales, 2010; Paltridge, 2014; Paltridge, Starfield & Tardy, 2016; Swales, 2004). They have provided sound empirical evidence to affirm

that the texts written in English by researchers from non-Anglophone lingua-cultural environments tend to exhibit, along with standard Anglophone features, some distinctive lexico-grammatical, discursive and pragmatic features as well as distinctive argumentative and intellectual styles, different from the text-linguistic features and styles that characterize similar texts written in English by Anglophone researchers. This has been extensively described in EAP and contrastive rhetoric studies over the past decades (Duszak, 1994, 2005; Duszak & Lewkowicz, 2008; Kachru, 2006, 2008, 2009; Kouřilová, 1998; Kuteeva & Mauranen, 2013; Mauranen et al., 2010; Pérez-Llantada, 2007, 2012, 2013, see also research findings from InterLAE at www.interlae.com). Chapters 3, 4 and 5 include a succinct literature review of the main issues raised in these studies.

Additionally, there have also been studies that have investigated non-Anglophone writers' perceptions and attitudes towards the spread and advancement of English for research publication purposes and the problems resulting from such spread. As stated previously, the scholarly literature has conceptualized the advancement of English as a form of linguistic imperialism (Phillipson, 1992) with detrimental effects on the existing linguistic diversity in academic and research settings and elsewhere (Phillipson & Skutnabb-Kangas, 1993). One major issue raised has been the problematization of the hegemony of the Anglophone academic writing conventions at a time where English is spoken by more non-Anglophone than Anglophone academics. A case in point has been the emergence of English as a Lingua Franca (ELF heretofore) in the academic spoken medium (Jenkins, 2007; Mauranen, 1993, 2010; Seidlhofer, 2011). Advocating the functionality of ELF, Mauranen (2003) postulates that it might be more appropriate to adopt the concept of the 'competent intercultural communicator' as a new reference model, thus displacing the native English-native model. Studies on attitudes and perceptions have further revealed that the nature, role and status of English, the roles and statuses of other academic languages, as viewed by non-Anglophone communities

of researchers, are very complex and have multiple dimensions (Lillis & Curry, 2010; Muresan & Pérez-Llantada, 2014; Plo & Pérez-Llantada, 2015). The overall stance of the literature is that ERPP is 'a language for communication' and not 'a language for identification' (House, 2003) and, as such, it should not represent a threat to other academic languages or a threat to the national language and identity.

Text-linguistic methodology, involving genre analysis and phraseological analysis (Swales, 1990, 2004) was deployed to explore the textualization of biomedical knowledge and describe its macro-rhetorical and lexico-grammatical profile. These frameworks also assisted the comparison of different 'English language variants' across the previously mentioned textual levels: native academic English *vis-à-vis* non-native academic English. This latter variable included texts written in English by Spanish researchers and texts written in English by writers with L1s other than Spanish. Using corpus linguistics methods, my aim was to compare the textual similarities and differences across language variables.

Supplementing the quantitative corpus linguistics approach, ethnomethodology, a qualitative methodology, was selected as an appropriate analytical approach to explore researchers' attitudes and perceptions towards ERPP. As explained in a forthcoming chapter, I designed an interview protocol to be administered to the sample population surveyed in order to understand their views about English and the role of English as well as their research writing practices in English. A further aim was to compare their perceptions with the reported views and perceptions of other communities of non-Anglophone writers that also use ERPP (Armstrong, 2011; Chiu, 2001; Ferguson et al., 2011; Flowerdew, 1999, 2000, 2001, 2008; Medgyes & Kaplan, 1992; Muresan & Pérez-Llantada, 2014; Muresan & Nicolae, 2015; Pérez-Llantada, 2007, 2012; Pérez-Llantada et al., 2011, among others).

Lastly, to understand the context of academic text-production in English and the actual practices of text-production in English I deemed it appropriate to explore the language dynamics involved in the knowledge exchange and dissemination practices of the community of practice investigated and do so using the frameworks of ethnography and textography (Barton & Hamilton, 2000; Lillis, 2008; Paltridge, 2008; Paltridge et al., 2016; Swales, 1998). It was hoped that the observation of the writers' actual physical spaces, materials and texts for knowledge access and dissemination at their professional workspaces could yield relevant insights into the role and functions of English and, in particular, into the existing ecologies of research languages and research genres. Drawing on the works of Swales (1998) and Spinuzzi (2003, 2004), my goal was to gain insights into the status of English *vis-à-vis* those of other academic languages for scientific knowledge access, research exchange and dissemination.

The following research questions were posed for this PhD investigation:

1. What are the rhetorical and phraseological features of texts written in English by L2 English Spanish-based researchers in the biomedical field? What are the similarities and differences of these L2 English texts compared to texts written by L1 English writers and L2 English researchers (other than Spanish researchers) in this field?
2. How are the roles and functions of English for Research Publication Purposes perceived by researchers from a Spanish linguacultural background? What challenges does ERPP pose to these researchers, as EAL users, in the biomedical research field?

3. What is the role of academic English *vis-à-vis* other academic languages in the workspace of the community of biomedical researchers investigated? What are its functions in this particular site of social engagement?

In the belief that research should inform pedagogy, a secondary aim of the present study was to formulate several proposals for English for Academic Purposes pedagogical practice. In the conclusion chapter of this PhD I will also discuss several implications of the findings and provide suggestions for teaching/learning English for international research communication in the biomedical field.

The data collected is also expected to inform professionals working in the fields of biomedical translation, revision and linguistic mediation, as Lillis and Curry (2010) also do and recommend. Language brokers support researchers when publishing in English in various different ways.

In closing, several avenues for future research will be briefly outlined.

2.1 Quantitative and qualitative research methods

This PhD draws on both quantitative (corpus linguistics) and qualitative (ethnomethodological and ethnographic) methods, aligning with Richards' (2005) view that "qualitative and quantitative data do not inhabit different worlds; they are different ways of recording observations of the same world" (p. 36). As shown in Figure 2.1, the overall research design of this PhD was based on the following methodologies:

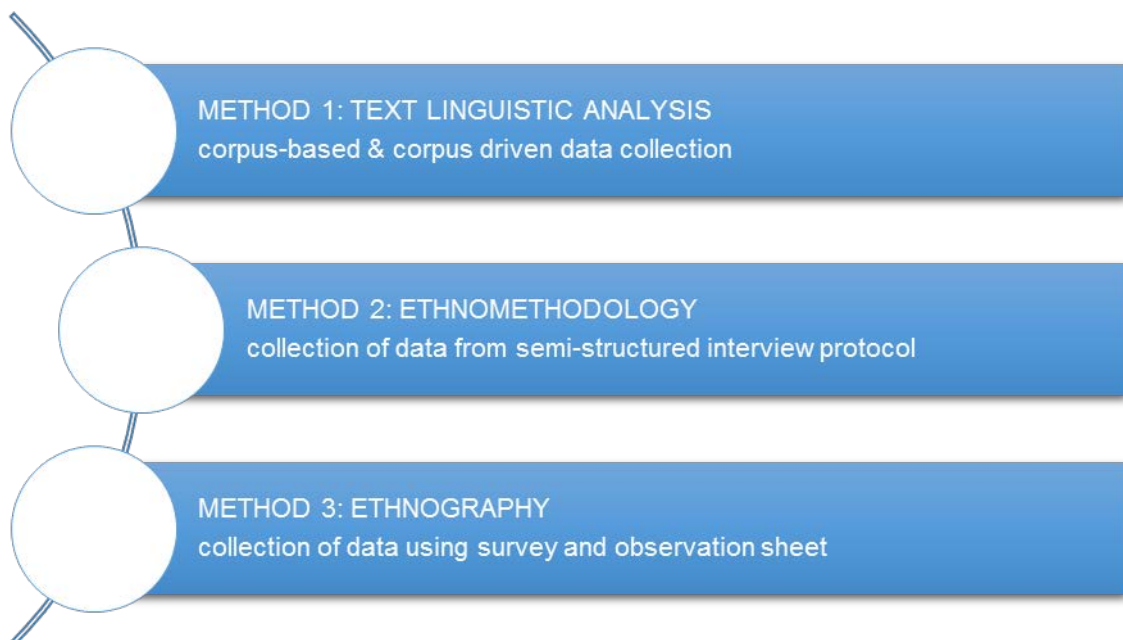


Figure 2.1

Proposed research methodologies.

In what follows in this chapter I summarize the scope of these three complementary methodological approaches and describe the specific procedures (data gathering, data collection, and data analysis and data interpretation) that I used to fulfill the PhD goals.

2.2 Quantitative research

Several definitions of quantitative research can be found in the literature. The following are the six main defining features of quantitative research:

1. The use of numbers: this is one of the most relevant features of quantitative research although it is not possible to understand their meaning without looking at its contextual background.
2. A priori categorization: when there is a research plan, researchers tend to use “categories” or “codes” to organize and shape the information obtained. They analyse the categories they are going to use and give them a logical scale of values which can be expressed in numbers.
3. Variables rather than cases: in quantitative research, the most important information is the one obtained from groups rather than from individuals. In contrast, in qualitative research, the most important information is the one obtained from individuals. Quantitative research is focused on the study of variables that afterwards are quantified by counting, scaling, etc. Their intention is to identify the relations between variables through their analysis.
4. Statistics and the language of statistics.

5. Standardized procedures to assess objective reality. As previously mentioned, quantitative research seeks to avoid the individual based subjectivity along the different phases of the research process and, therefore, several rules need to be established so that objectivity is maintained, no matter the research subject or field.
6. Quest for generalizability and universal laws.

2.2.1 Corpus linguistics

'Corpus' is a Latin word that means 'body'. The term 'corpus' as used in modern linguistics is defined as "a collection of sampled texts, written or spoken, in machine-readable form which may be annotated with various forms of linguistic information" (McEnery, Xiao & Tono, 2006, p. 4). Corpus linguistics is the area of linguistic research that deals "with some set of machine-readable texts which is deemed an appropriate basis on which to study a specific set of research questions" (McEnery & Hardie, 2012, p. 1). These authors list the following generalizations regarding corpus design and corpus compilation, which were taken into consideration to design the data collection procedures of this PhD:

- The corpus size cannot be large if it is searched by hand and it would take long time to gather it unless we would use a computer to read it.
- The use of tools allows the user to search through information rapidly. Some of these tools are called 'concordancers', that ease the production of frequency

data as, for example, word frequency lists, which retrieve all the words that appear in a corpus and count how many times this word occurs in that corpus.

- The length of the corpus does not matter, but the corpus data selected must be directly related to the research question posed.
- It is important to bear in mind that although the texts selected for a given study seem to be similar (following the variables for corpus comparability), differences are going to be found.

In 1992, Leech claimed that “computer corpus linguistics defines not just a newly emerging methodology for studying language, but a new research enterprise and, in fact, a new philosophical approach to the subject” and a new linguistic paradigm (p. 106). In 1993, Stubbs rejects the limited definition of corpus linguistics as a methodology, drawing on Sinclair’s (1991) claim that “a corpus is not merely a tool of linguistic analysis but an important concept in linguistic theory” (pp. 23-24). In 2001, Tognini-Bonelli (2001) described corpus linguistics as a “pre-application methodology” which possesses “theoretical status” (p. 1). For Meyer (2002), corpus linguistics is a collection of texts or parts of texts upon which some general linguistic analysis can be conducted (p. xi). Mahlberg (2005) describes corpus linguistics along similar lines, namely, as “an approach to the description of English with its own theoretical framework” (p. 2), and uses the term ‘corpus theoretical approach’.

Although corpus linguistics always uses machine-readable texts, history has shown that much of the early work was undertaken in paper form (e.g. in early 1952 Fries prepared an English grammar based on a corpus). Small corpora that have been manually compiled have been analysed; for example, Ghadessy and Gao (2001). Nowadays all corpus texts are machine-readable (McEnery et al., 2006).

There are different types of corpus studies that can be conducted on the basis of a number of aspects that discriminate between types of work: i) mode of communication: written, ii) corpus-based vs. corpus-driven linguistics, iii) the data collection regime, iv) the total accountability vs. data selection and v) multilingual corpus (McEnery, 2005).

The terms 'corpus-based' and 'corpus-driven' were introduced by Tognini-Bonelli in 2001. The 'corpus-based/corpus-driven' distinction has contributed to the discussion of the differences between rationalism and empiricism philosophies (Leech, 1992; Meyer, 2002). There are four main differences between the corpus-based and the corpus-driven approaches: the types of corpora used the attitudes towards existing theories and intuitions, the focus of research and the paradigmatic claims. Both approaches complement each other. As Fillmore (1992) remarks, "[t]he two kinds of linguists need each other or better, the two kinds of linguists, wherever possible, should exist in the same body" (p. 35). This PhD seeks to support the importance and the value of establishing synergies between both approaches.

In both corpus-driven and corpus-based approaches to textual analysis, three important aspects are described regarding corpus data: representativeness, corpus size and annotation. The former two were taken into consideration when designing this PhD methodology. The first difference is that in corpus-driven research reaching corpus balance and representativeness is not needed because the corpus grows in "cumulative representativeness" (Lüdeling & Kytö, 2009, p. 994), as will also be shown when identifying correlations between rhetorical and phraseological levels of textual analysis.

The second aspect is that the corpus-driven approach involves a methodology in which the corpus is used as an empirical basis from which data is extracted and linguistic phenomena are identified without prior expectations (Tognini-Bonelli, 2001). Conclusions are drawn from the in-depth observation of the corpus, whether large or

small. The third aspect is that, unlike corpus-based research, which draws on different attitudes towards existing theories and intuitions, corpus-driven approaches do not involve corpus annotation. Corpus-driven linguists do not take a corpus with pre-conceived theories that ease to take the information that corpus offers without taking into account the insights that may have been learnt over the time through their education. This was the approach taken to develop the phraseological analysis reported in this PhD. In contrast, corpus-based linguists have a different attitude towards existing theories and thus consider the existing theory as a starting point. In the case of this study, genre theories in ERPP and socio-rhetorical analyses of academic texts were taken as the starting point of the analysis.

Another important difference between corpus-driven and corpus-based research is that corpus-driven linguists aim to build theory 'from scratch' justifying that they are free from pre-corpus theoretical premises and base their ideas on the actual corpus data analysis. They assume that all the relevant information is contained in the corpus itself, and the linguist's task is to extract that information and interpret it (McEnery, 2005). Corpus-based linguists, however, tend to approach corpus data from corpus-external premises with the aim of testing, validating, extending and/or improving such pre-existing theories (McEnery, 2005).

Tognini-Bonelli (2001) explains that in a corpus-based approach corpora are mainly used to "expound, test or exemplify theories and descriptions that were formulated before large corpora became available to inform language study" (p. 65). Corpus-based linguists are said not to be completely committed to corpus data. They have to discard inconvenient evidence (for example, data that does not fit the pre-corpus theory) by 'insulation', 'standardization' or 'instantiation' (Lüdeling and Kytö, 2009). In contrast, corpus-driven linguists are said to be completely committed to "the integrity of the data as a whole" (p. 84) and therefore, "[t]he theoretical statements are fully consistent with, and reflect directly, the evidence provided by the corpus" (p. 85).

The third difference between corpus-driven and corpus-based approaches is the 'focuses of research'. In a corpus-driven approach, there is no distinction between lexis, syntax, pragmatics, semantics and discourse. These are considered to be pre-corpus concepts that are combined to create meaning. Aligning with this view, I aimed at investigating the lexico-grammatical level and its discourse functions, instead of looking at lexis and grammar features separately. Corpus-based methods look at these different textual layers of analysis. Finally, regarding the fourth difference ('paradigmatic claims'), the corpus-driven approach claims to be a paradigm with which a whole language could be described. This is not implied in the corpus-based approach. A corpus-based approach is thus used in almost all branches of linguistics as a methodology that makes use of corpus data to test intuitions and verify hypotheses. This was the stance of the rhetorical analysis carried out in the following chapter.

2.2.2 Corpus design and compilation

This PhD thesis should acknowledge the invaluable support of InterLAE (Interpersonalidad en el Lenguaje Académico Escrito), a consolidated research group based at the University of Zaragoza, Spain, and funded by the Government of Aragon (<www.interlae.com>). The text-linguistic analysis conducted in Chapter 3 was in part based on the biomedical component of SERAC, the *Spanish-English Research Article Corpus*, a specialized corpus compiled by InterLAE in order to study the linguistic resources of disciplinary texts written by researchers from two different cultural backgrounds, Anglophone-based backgrounds and a Spanish-based background (see Pérez-Llantada, 2012 for further details). SERAC 1.0 comprised a total of 558 research articles published in scholarly journals. It represents four main academic divisions: Humanities and Arts, Social Sciences and Education, Physical Sciences and

Engineering and Biological and Health Sciences. Each academic division is divided into two sub-disciplinary fields. As for language representativeness, SERAC includes research articles in L1 academic English (labelled ENG texts) and in L2 academic English (labelled SPENG texts), the former sub-corpus included texts representative of academic written discourse produced by Anglophone scholars and the latter included texts written in English by Spanish academics.

Given the scope of SERAC both for contrastive linguistic analysis and pedagogical purposes, InterLAE developed a larger corpus with the aim of obtaining a wider description of research article writing by researchers from the two linguacultural contexts. Nowadays, SERAC 2.0 is, to the best of my knowledge, the largest specialized contrastive research article corpus, containing 1,056 texts and amounting to 5.7 million words. It represents twelve different sub-disciplinary areas across the four academic divisions: applied linguistics, information science, literature, sociology, business management, geography, urology, haematology, oncology, mechanical engineering, food technology and earth sciences (for a full description of SERAC 2.0 see Pérez-Llantada, 2012, pp. 73-77).

Because the focus of this PhD was biomedical research knowledge production and dissemination, I decided to select all the texts representing the variables ENG and SPENG of the biomedical component of SERAC. The biomedical component of SERAC included texts representative of two biomedical disciplines, haematology and oncology. For comparison purposes and, also, in order to learn how to compile a corpus, I decided to collect a third subset of texts, that I labelled 'ELF texts', following InterLAE coding procedures (i.e. texts written in English by researchers from non-Anglophone contexts other than Spain) in the same disciplinary fields, haematology and oncology. To gain further skills in corpus research methodologies and to be able to explore sub-disciplinary variation, I also decided to compile texts representative of a third sub-disciplinary field, biochemistry, and by this means support the corpus

compilation activity of InterLAE. The overall size of the extended biomedical component totalled 1,034,700 words. Table 2.1 summarizes the overall statistics retrieved with *Wordsmith Tools v5* (Scott, 2008).

Table 2.1

Overall statistics and lexical profile of the extended biomedical corpus.

	ENG	SPENG	ELF
tokens (running words) in text	407,659	369,464	257,577
types (distinct words)	16,835	15,264	12,694
type/token ratio TTR	4.553175	4.5592079	5.339581
standardized TTR	34.494297	35.441097	35.251808
standardized TTR std. dev.	65.861549	63.862709	64.016586
sentences	15.015	13.137	10.400
mean (in words)	24.624908	25.485083	22.859528
std. dev.	14.65626	15.773697	12.401972

The extended corpus included 270 biomedical journal articles, 90 texts representing the ENG variable, 90 texts representing the SPENG variable and another set of 90 texts representing the ELF variable. Each language variable included 30 texts in Haematology (HAE), 30 in Oncology (ONC) and 30 texts in Biochemistry (BIOQ). Table 2.3 summarizes the distribution of the variable 'discipline' (haematology, oncology and biochemistry) across language variables (ENG, SPENG and ELF). All the texts in each disciplinary field were retrieved from the same impact factor journals (see full list in Appendix I). They were downloaded in pdf format from University of Zaragoza and then converted to txt. format to make them readable by corpus processing tools. Each text was assigned a short label providing descriptive information about the sample of language/discipline it represented. Accordingly, each text was given an alphanumeric label composed of an abbreviated language/discipline code and a number in the range 1-30 (e.g. ENGHAE 1, ENGHAE 2, etc.). The abbreviations used for language were English: ENG, Spanish-English: SPENG; English Lingua Franca: ELF and for disciplines Haematology: HAE, Oncology: O, Biochemistry: BIOQ.

Table 2.2.

Overall word count across 'discipline' and 'language' variables.

	Discipline	No. of texts	Running words	Total nº of words
ENG	ENG HAE	30	129,805	407,659
	ENG ONC	30	104,112	

	ENG BIOQ	30	173,742	
SPENG	SPENG HAE	30	125,455	369,464
	SPENG ONC	30	105,749	
	SPENG BIOQ	30	138,260	
ELF	ELF HAE	30	79,238	257,577
	ELF ONC	30	107,910	
	ELF BIOQ	30	70,437	

McEnery and Hardie (2012, p. 1) list the following generalizations regarding corpus design and corpus compilation:

- The corpus size cannot be large if it is searched by hand and it would take long time to gather it unless we would use a computer to read it.
- The use of tools allows the user to search through information rapidly. Some of these tools are called concordancers, that ease the production of frequency data as, for example, word frequency lists, which retrieve all the words that appear in a corpus and count how many times this word occurs in that corpus.
- The corpus data selected must be directly related to the research question posed.

The following indications were considered in the corpus compilation stage: the corpus size was suitable for manual searching of texts, software tools were used to search through information rapidly and the corpus data selected was directly related to the first research question posed (RQ1).

2.2.3 Corpus analytical procedures

For the analysis of texts, it was found of interest to combine a top-down bottom up analysis, that is to say, to first look at the overall (macrostructural) information organization patterning of the texts and, then, move down and take a bottom-up approach to explore phraseology use and the recurring discourse functions of the phraseology in the texts. Figure 2.2 summarizes the analytical framework, seeking to understand both the macrostructural organization and lexico-grammatical features of the texts.

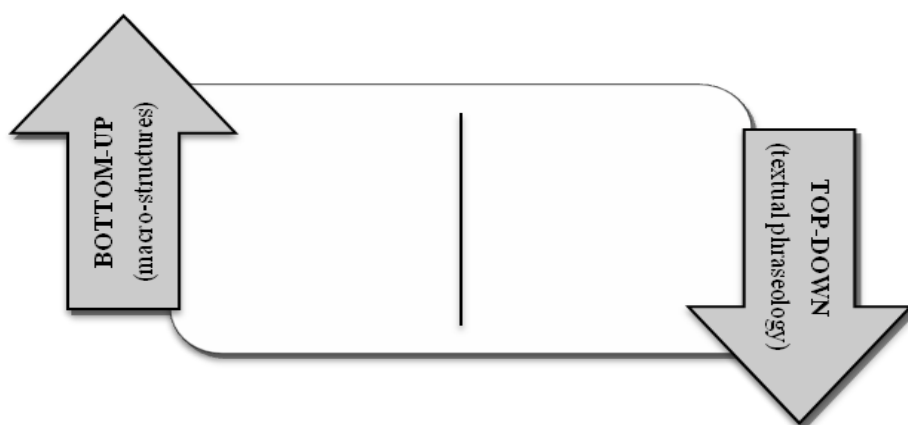


Figure 2.2

A top-down bottom-up data analysis framework.

For the top-down analysis, a corpus-based approach was used. This is the kind of approach recurrently used in the previous literature to investigate macro-structural patterns, that is to say, the overall textual organization of research articles (Lin & Evans, 2011; Pérez-Llantada, 2012; Tognini-Bonelli, 2001). My aim was to make use of corpus data to test intuitions as to how writers in the three language variables (ENG, SPENG and ELF) and in the three disciplines (haematology, oncology and biochemistry) organize textual information. It was my aim to verify the following research questions: Does the variable 'language' have an impact on the overall macrostructural organization of biomedical texts? And does 'discipline' have an impact on it? (cf. RQ1 in the introductory chapter).

Text-linguistic analytical procedures first involved a top-down analysis of the rhetorical macrostructures of the texts in the three language variables (ENG, SPENG and ELF) and in the three disciplines (HAE, ONC and BIOQ). The comparison of rhetorical macrostructures was carried out drawing on the theoretical perspectives of socio-rhetoric and composition and genre analysis. In analysing these macrostructures I sought to compare the affinity and/or possible divergences with regard to the overall organization of textual information. I drew on seminal genre studies (Swales, 1990, 2004; Swales & Feak, 2009) and sociorhetorical and composition studies (Bailey, 2003; Berkenkotter & Huckin, 1995; Swales & Feak, 2000, 2004) and studies of communication theory. As mentioned earlier, the publication standards of scientific journals from which I extracted the texts for the compilation of the corpus and, especially, the Vancouver protocol, the one dictating the recommendations for journal article submissions were also very useful frames of reference.

For the bottom-up analysis, I adopted corpus-driven techniques, following previous studies (Ädel & Erman, 2012; Biber, 2009; Biber & Barbieri, 2007; Biber, Conrad, & Cortes, 2004; Biber & Conrad, 1999; Granger, 1998; Pérez-Llantada, 2015; among others). As the authors of these studies do, I made no distinction between lexis and

syntax, considering both to be pre-corpus concepts that are combined to create meanings.

Phraseology is the study of word combinations, their recurring structural patterns, meaning and usage (Cowie, 1994; Howarth, 1996; Luzón Marco, 2000). Pioneering work in phraseological research was 'Second Interim Report on English Collocations', by H. E. Palmer and A. S. Hornby in 1933. Research on phraseology draws on different, and equivalent, terminological coinage, the most common concepts being 'recurring word combinations', 'phraseological units', and 'lexico-grammar/lexico-grammatical patterns', both in written and spoken discourse (see Cowie, 1998; Howarth, 1996). Wray (2000) proposed the term 'formulaic sequence' as an umbrella term including a wide range of labels. For Wray (2000), a formulaic sequence is defined as follows:

[...] a sequence, continuous or discontinuous, of words or other meaning elements, which is, or appears to be, prefabricated: that is, stored and retrieved whole from memory at the time of use, rather than being subject to generation or analysis by the language grammar. (p. 465)

Soon this term was accepted by researchers and has been widely used in the field since then. Although it may seem very difficult to classify the different types of word combinations in phraseology, Aisenstadt (1979) explained that the elements in word combinations are said to have certain problems of commutability, that is, a restriction in collocation, based on commutability and transparency, this author divided all the word-combinations into two main groups: idioms and non-idiomatic collocations. The present study looks into the latter group. This classification has been useful in this thesis to

identify the frequency of use and the structural patterns of recurring word combinations (see Chapter 3).

In this PhD, I took a corpus-driven approach to examine the recurring phraseology and identify similarities and differences across the aforementioned language variants and discipline variables. For the analysis of formulaic language in the three sets of texts I used automatic extraction and retrieved three frequency lists. The three-word scope (i.e. 3-grams) was selected considering the size of the corpus. The four-word scope (i.e. 4-grams) is “the most researched length for writing studies” (Chen & Baker, 2010, p. 32), yet it should be acknowledged that this measure is appropriate for much larger corpora of academic writing (cf. Pérez-Llantada, 2014; Hyland, 2016). This was not the case of the corpus compiled for this PhD.

Free software package *kfN-gram* (Fletcher, 2002-2007) was used. This software enables to obtain lists of high-frequency *n*-grams (i.e. recurring phraseological units). As Biber et al. (1999, pp. 992-999) state, lexical bundles are those that occur at a low frequency cut-off (e.g. 10 times per million words), and spread at least along five different texts “so as to exclude individual writer idiosyncrasies” (Biber et al., p. 992; cf. also Biber & Barbieri, 2007; Biber, Conrad & Cortes, 2003). For the present PhD study I excluded bundles with the hash # symbol representing any number (e.g. # shown in figure). This procedural protocol enabled me to ensure that the obtained bundles were lexico-grammatical combinations or “multi-word formulaic sequences” (Biber, 2009, p. 277). Having retrieved the three frequency lists of 3-word bundles with Fletcher’s software, descriptive statistics were obtained using the statistics available at the Word List option of *Wordsmith Tools* v.5 (Scott, 2008). Using this programme, both tokens (running words) and types (the number of distinct words in each subset of texts) were obtained. Type/token ratios (TTR) and standardised type/token ratios (STTR) computed every 1,000 words in each subset of texts were also used to identify the lexical profile of the texts. Statistical data are summarized in Table 2.3.

Table 2.3

Overall corpus statistics.

	ENG	SPENG	ELF
tokens (running words) in text	407,608	369,219	257,585
types (distinct words)	16,835	15,264	12,694
type/token ratio TTR	4,553174973	4,559207916	5,339581013
standardized TTR	34,49429703	35,44109725	35,25180817
standardized TTR std. dev.	65,86154938	63,86270905	64,0165863
sentences	15,015	13137	10400
mean (in words)	24,62490845	25,48508263	22,85952759
std. dev.	14,65626049	15,7736969	12,40197182

Wordsmith Tools was also used to identify *n*-grams occurring a minimum of 3 times and in at least 10% of the texts. This was the established cut-off level for data comparison across the three language variables and the three disciplines represented in the corpus. Lists of 3-word bundles, one from each set of texts, were generated and their

subsequent comparison served to identify the core (shared) bundles in ENG, SPENG and ELF, and the non-core (non-shared/distinctive) bundles.

As stated previously, seminal corpus studies guided the present analysis (Ädel & Erman, 2012; Biber et al., 1999; Biber & Conrad, 1999; Biber, Conrad & Cortes, 2003, 2004; Pérez-Llantada, 2014). It was initially hypothesized that the phraseology of the SPENG texts was almost but not fully native-like (i.e. similar to the phraseology of the ENG texts). The results of the phraseological analysis are reported in Chapter 3.

2.3 Qualitative research

Qualitative research methods focus on the experiences, thoughts and perspectives of the participant (Creswell, 1998). Denzin and Lincoln (2005) define qualitative research as a situated activity that locates the observer in the world. These authors explain that this kind of research consists of a set of interpretive, material practices that make the world visible and transform the world. As they put it, “they turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self” (p. 3). At this level, qualitative research involves an interpretive, naturalistic approach to the world. Qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them (for further discussion, see Denzin & Lincoln, 2005).

Denzin and Lincoln (2005) further note that qualitative research is difficult to define clearly, as it has no theory or paradigm that is distinctly its own, “nor does qualitative research have a distinct set of methods or practices that are entirely its own” (pp. 6-7). In qualitative research the information is collected by the researcher through ethnographic work, interviews and case studies in which it is necessary the interaction

between the participants and the researcher. The results are taken from the participant and the researcher in a given situation. They are both non-numerical data and non-statistical.

Qualitative research methods are also said to be inductive because the researcher can obtain hypotheses, explanations or construct theories from the information provided by the participant. In some cases, it is difficult for the researcher to set aside his/her personal opinions, experiences or perceptions. This adds difficulties to ensure objectivity in his study and the subsequent conclusions. In qualitative research methods there is just an existing "truth", no matter the human perception (Lincoln & Guba, 1985). The researcher's main goal is the "systematization of the collection, coding and analysis of qualitative data for the generation of theory" (Glaser & Strauss, 1967, p. 18).

Patton (2002, pp. 40-41) proposes the following list with the "Twelve Major Characteristics of Qualitative Research":

1. Naturalistic inquiry
2. Emergent design flexibility
3. Purposeful sampling
4. Qualitative data
5. Personal experience and engagement
6. Empathic neutrality and mindfulness
7. Dynamic systems

8. Unique case orientation
9. Inductive analysis and creative synthesis
10. Holistic perspective
11. Context sensitivity
12. Voice, perspective, and reflexivity

Dörnyei (2007, p. 37) defines qualitative research by highlighting the following aspects:

1. Emergent research design

An important aspect of this emergent nature is the fact that, ideally, qualitative researchers enter the research process with a completely open mind and without setting out to test preconceived hypotheses. This means that the research focus is narrowed down only gradually and the analytic categories /concepts are defined during, rather than prior to, the process of the research.

2. The nature of qualitative data

In qualitative research it is frequent to work with a wide range of data including recorded interviews, various types of texts, (field notes), and journal and diary entries, documents, etc. Along the data processing, the aforementioned data is transformed into text form because most qualitative data analysis is done with words.

3. The characteristics of the research setting

The Qualitative research objective is to describe social phenomena in a natural process to avoid any manipulation and therefore, it is conducted through an intensive and prolonged contact with the participant.

4. Insider meaning

Qualitative research is based on subjective opinions and on the experiences or feelings of individuals. The goal in this case would be analyse the participants' point of view about the situation that is being studied.

5. Small sample size

Qualitative research samples are much smaller (participants) than Quantitative ones because their groundwork is much labour-intensive.

6. Interpretive analysis

Qualitative research is mainly interpretive because the results that the researcher gets depend directly on the subjective interpretation that the researcher makes of the data, which means that several interpretation of the same results could be provided.

Considering the value of these approaches, ethnomethodology and ethnography, I decided to draw on the two qualitative methods. The aim was to explore the communication practices of a cohort of Spanish biomedical researchers writing in English. Chapters 4 and 5 seek to contribute to qualitative research on the issue of biomedical research writing by non-Anglophone scholars.

2.3.1 Ethnomethodological protocol

The term 'ethnomethodology' was coined to refer to the study of the human being in his daily life within a society and how such routine may become relevant for others (Garfinkel, 2006, p. 20). For Garfinkel, ethnomethodology can provide the scientific ideas required to make from order something observable and intelligible.

In this PhD, I developed several data collection protocols to explore the research writing practices of the cohort of researchers investigated, namely, an online survey, a semi-structured interview and an observation sheet. They were all designed with the purpose of identifying and understanding the following aspects of their writing practices: the researchers' exposure to L2 English writing, their language competence in general English and their literacy competence both in their academic L1 (Spanish) and in L2 academic (English). Previous studies have used similar ethnomethodological methods for the investigation of communities of researchers in Europe and elsewhere (Armstrong, 2011; Chiu, 2001; Ferguson et al., 2011; Flowerdew, 2001; Jarc & Godnic Vivic, 2012; Lillis & Curry, 2010; Medgyes & Kaplan, 1992; Muresan & Pérez-Llantada, 2014; Pérez-Llantada, 2007, 2012; Pérez-Llantada et al., 2011; Tusting & Barton, 2016). Hymes (1972) highlighted the importance of immersion in the setting of participant to observe practices.

Supplementing the corpus linguistics approach described in the previous chapter of this PhD, the use of an ethnomethodological approach was expected to shed light into the researchers' attitudes and perceptions towards the status and role of English for international scientific knowledge access, communication and dissemination. To this aim, I adapted the interview protocol employed with other disciplinary cohorts of Spanish academics (Ferguson et al., 2011; Pérez-Llantada, 2012) to the specific

context investigated and conducted personal interviews with a convenience sample of MPs based in Zaragoza ($n=20$).

The semi-structured interview protocol comprised fourteen questions (see Appendix II). Questions for the semi-structured interviews were divided into two main groups: a) those enquiring into the reasons for using English for research purposes and b) those enquiring into the challenges posed by the use of English for research purposes. The aim was to understand the researchers' writing for publication experiences and their research communication genre-mediated practices and identify the perceived role English played in those activities. The main findings of the interviews are reported in Chapter 4 of this dissertation.

Essentially, the interview protocol intended to explore the perceptions and attitudes of these researchers towards the hegemonic role and communicative functions of English as an international language for research communication, and compare those perceptions with the views and perceptions of other non-Anglophone researchers that also use English for international research communication in Europe, the Arabic Gulf, Canada, India, China, Mexico, Sudan or Turkey (Armstrong, 2011; Chiu, 2001; El Malik & Nesi, 2008; Ferguson et al, 2011; Flowerdew, 2001; Jarc & Godnic Vicic, 2012; Hanauer & Englander, 2014; Kachru, 2006, 2009; Li, 2014; Medgyes & Kaplan, 1992; Muresan & Pérez-Llantada, 2014; Pérez-Llantada, 2007, 2012; Pérez-Llantada et al., 2011; Uzuner, 2008), who have shifted or are shifting to English for research publication purposes.

The first step to gather the interview data was to obtain the email addresses of all the researchers and contact them personally. Consent forms were used and treatment of data was confidential. The interviews were conducted in May 2015 at one of the two teaching hospitals at the University of Zaragoza, Spain. The twenty specialists belonged to three departments, which matched with the disciplinary specializations that

I had previously selected in the corpus analysis of texts: haematology, oncology and biochemistry. I was able to contact six specialists in the Haematology department, eight in the Oncology department and six in the Biochemistry department. Both senior and junior professionals were interviewed in the three departments, as summarized in Table 2.4.

Researchers who had three to five-year experience were considered junior researchers. Researchers with more than five years of experience were considered senior researchers. All the interviews took place in the hospitals and later recorded and transcribed for subsequent data analysis. The interviews were conducted in Spanish so that all the interviewees could follow the interview and respond to the questions easily. Each interview lasted for about 30-40 minutes.

Table 2.4

Population selected for the interview protocol.

	No. of junior researchers	No. of senior researchers	Total no. of researchers interviewed
Haematology department	2	4	6
Oncology department	5	3	8
Biochemistry department	2	4	6

The total number of words transcribed was 51,340 and the total recordings amounted to 13 hours 50 minutes. Subsequent close reading of the transcribed data enabled the identification of the recurring themes on English for research publication purposes that the researchers raised in the interviews.

2.3.2 Ethnographic protocols

Fetterman (1988) defined ethnography as “the art and science of describing a group or culture” (p. 11). In essence, an ethnography is “a descriptive study of an intact cultural or social group or an individual or individuals within the group based primarily on observation and open-ended interviews. Ethnography is based on learning from people as opposed to studying people” (Beebe, 2001, 2014). For other researchers, ethnography research “involves the study of groups and people as they go about their everyday lives” (Emerson, Fretz & Shaw, 1995).

As stated in the literature, the key to understand the differences between ethnography and qualitative research methods is to understand the wide variety of combinations of techniques, data collection methodologies within the term ‘ethnography’. Ethnographies provide a holistic perspective, often of greater depth than other qualitative research methods. Sampling measures are conducted over a period of time and the researcher herself is the primary tool for data collection. Lillis (2008) defines ethnography as a method, as a methodology and as deep theorizing (Figure 2.3).

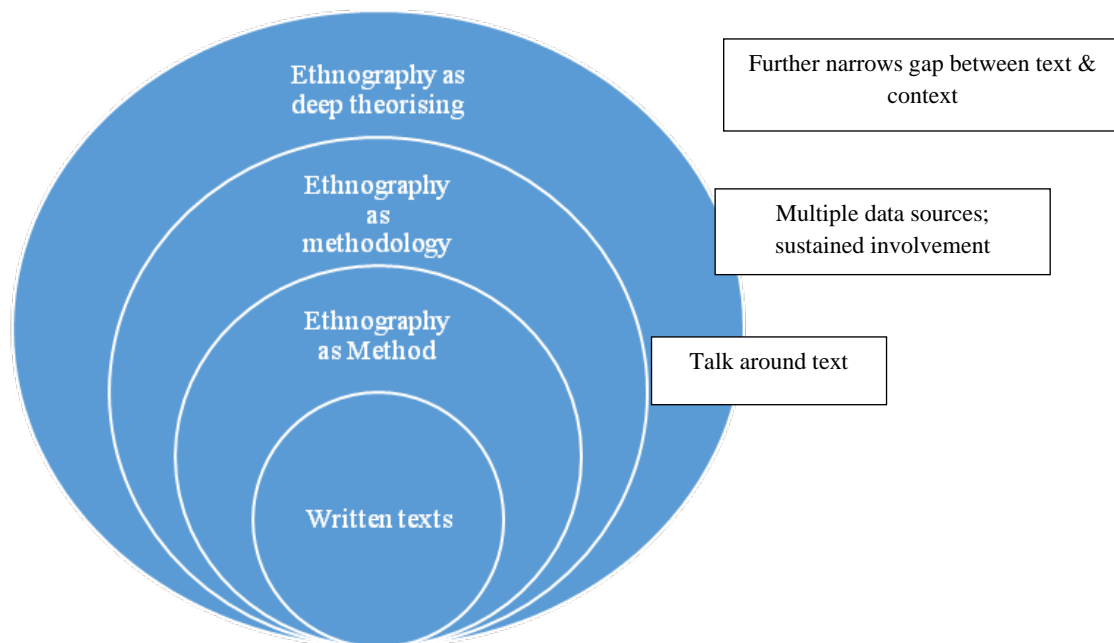


Figure 2.3

Ethnographic approach in the study of writing for publication purposes (Source: Lillis, 2008)

As stated previously, the ethnographic techniques for the present PhD included a preliminary online survey, the researcher's observation of the professional context and the collection of field notes taken over a period of seven days. In addition to observation fieldnotes, photographs were also taken during the ethnographic observation.

Lincoln and Guba (1985) based their theory of naturalistic inquiry on the idea that the researcher builds up his/her ideas using a researcher-centred method such as interviews, observation and document analysis in a repetitive cycle based on four elements: purposeful sampling, inductive analysis, grounded theory development and emergent design next-step decision making. This authors' work proved most insightful to collect data in a series of similar iterative cycles. Figure 2.4 illustrates the naturalistic

enquiry paradigm that inspired Chapter 5 in this PhD work and the cyclic process undertaken in this qualitative enquiry.

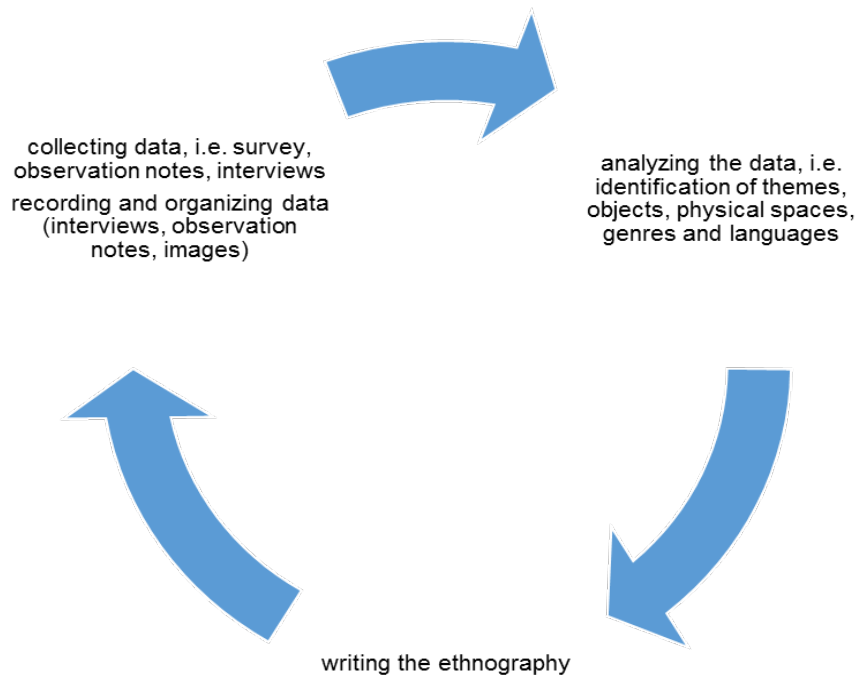


Figure 2.4

An adapted version of the ethnographic research cycle followed.

2.3.3 Analytical procedures

Glaser and Strauss (1997) highlighted the importance of “not contaminating one’s effort to generate concepts from data with preconceived concepts that may not really fit, work

or be relevant” (p. 31). In contrast, Strauss and Corbin (1998) considered the use of literature at early stages of the research as something that can stimulate theoretical sensitivity as well as generate hypotheses. Following these principles, I designed an observation sheet that would assist my exploration of the professional site of the cohort investigated. As for the use of data analysis methods, Lincoln and Guba (1985) recommend that the constant comparison technique should be the primary Grounded Theory technique.

Figure 2.5 summarizes the stages followed in this PhD for the ethnographic analysis:

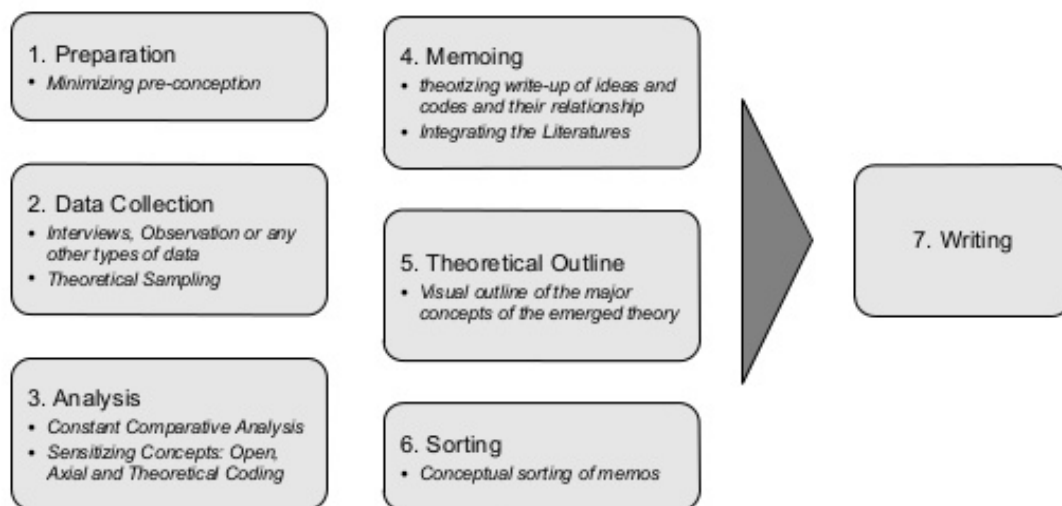


Figure 2.5

Stages of a Grounded Theory (Source:

http://www.health.herts.ac.uk/immunology/Web%20programme%20-%20Researchhealthprofessionals/stages_of_grounding_theory.htm).

Following Glaser and Strauss theory (1967), my aim was to collect a pool of rich, social contextual and situational data, as also done in previous studies in the EAP and linguistic ethnographic oriented studies (Dressen-Hammouda, 2012; Hyland, 2016; Lillis & Curry, 2010; Paltridge, 2008; Swales, 1998).

It should be noted here that the use of ethnographic methods has been, to the best of my knowledge, rarely applied in ESP research to date, with the exceptions of Swales (1998), Paltridge (2004), Lillis and Curry (2010) and Tusting and Barton (2016). The methodological procedures and the findings reported in Chapter 5 ought to be taken as descriptive and exploratory. Assessing the validity and scope of ethnographic research was also expected to become a novel contribution to the study of L2 research writing in the ERPP field.

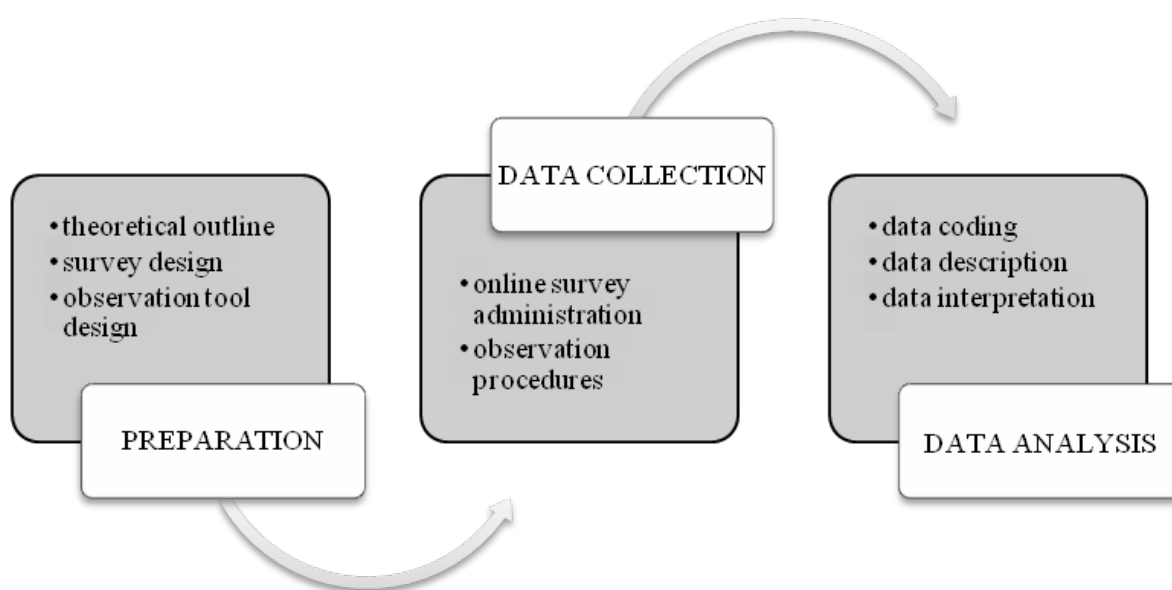


Figure 2.6

Stages planned to conduct the ethnographic analysis.

In order to complement the findings reported in Chapters 3 and 4, it was deemed of interest to identify the actual functions that English performed in the everyday practices of the cohort of researchers investigated and to identify and understand the English-mediated literacy practices of these researchers.

The online survey developed by the University of Zaragoza's researchers under the project FFI2015-63638-R was used to gather preliminary information from the selected population and, more broadly, to contribute to the research group's data collection. This preliminary survey helped contextualize the cohort and design the observation protocol. Data of the subjects' language competence and their genre and literacy practices in ERPP is summarized in Appendix III.

Afterwards, in situ observation was conducted. To this aim, an observation tool was designed. The observation tool for the ethnography is provided in Appendix IV. It comprises several tables with different descriptors. The purpose was to assist the identification (in terms of higher or lower physical presence) of the role of academic genres and academic languages in the site in which the cohort of researchers investigated conduct their professional practices. The observation tool was inspired by the theoretical framework of activity theory (Spinuzzi, 2003), which draws on socio-cultural studies and thus aligns with the strand of sociorhetorical studies used in the present PhD. More specifically, with the observation tool my aim was to identify the environment of which the researchers interacted, and more specifically, the text types (genres) and languages that they used to access, exchange and disseminate (publish) biomedical knowledge.

As postulated in genre theory (Swales, 1990, 2004) and activity theory studies, "texts are traditionally identified as mediational means to complete a task" and "genres are tools-in-use, and as such can be seen as mediating objects within the world". Aligning with this idea, it was deemed of particular interest to examine how the cohort of

researchers used writing (and written texts) to mediate their activities and, on the other hand, how they used language(s) to exchange and disseminate scientific knowledge. A secondary aim, also exploratory in nature, was to identify possible connections between genres within the activities that they mediate and possible correlations between a given genre or given genres and a given language/given languages. In the study of genre(s) and language(s) ecologies, it was also my intention to generate tentative hypotheses regarding the digitization of the work space, an area of enquiry that is gaining increasing interest today in the EAP field.

3. A TEXT-LINGUISTIC ANALYSIS OF EIL TEXTS

3.1 Macrostructural organization of RAs

The starting point of this chapter is the view of the research article (heretofore RA), which has been described as the research genre *par excellence* of all the repertoire of research genres (Swales, 2004). Devitt (1993, 2004, p. 31) defines 'genre' as a nexus between an individual's actions and a socially defined context. Genre is a reciprocal dynamic within which individuals' actions construct and are constructed by the recurring context of situation, the context of culture, and the context of genres.

Over the past decades it has been claimed that the way RAs are constructed in relation to genre prototypicality, e.g. focusing on aspects such as overall rhetorical organization at a discourse level, formulaic language use (Ädel & Erman, 2012; Cortes, 2004; Hyland, 2016; Swales, 1990). Bazerman, Bonini and Figueiredo (2010) explain that the work of genre analysts is to track these textual regularities and irregularities. The aim of this chapter is therefore to track textual regularities and irregularities at both rhetorical and phraseological levels of RAs written in three language variables: native English (ENG variant), non-native English by Spanish researchers (SPENG variant) and non-native English by researchers from linguistic backgrounds other than Spanish (ELF variant).

An important stock of research has focused on the macrostructural features of the research article genre. In broad terms, it has been concluded that the research article genre displays different rhetorical structures and that its overall information

organization of the textual contents is strongly dependent on variables such as disciplinary field. One of the recurring structures that these studies have analysed in scientific texts belonging to experimental fields is the so-called Introduction-Method-Results-Discussion, or IMRaD. For the particular case of biomedical research writing, authors are expected to adhere to the ICAME conventions, which state as follows:

Introduction

State the purpose of the article and summarize the rationale for the study or observation. Give only strictly pertinent references and do not include data or conclusions from the work being reported.

Methods

Describe your selection of the observational or experimental subjects (patients or laboratory animals, including controls) clearly. Identify the age, sex, and other important characteristics of the subjects. Identify the methods, apparatus (give the manufacturer's name and address in parentheses), and procedures in sufficient detail to allow other workers to reproduce the results. Give references to established methods, including statistical methods (see below); provide references and brief descriptions for methods that have been published but are not well known; describe new or substantially modified methods, give reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used, including generic name(s), dose(s), and route(s) of administration.

Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the

reported results. When possible, quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Avoid relying solely on statistical hypothesis testing, such as the use of P values, which fails to convey important quantitative information. Discuss the eligibility of experimental subjects. Give details about randomization. Describe the methods for and success of any blinding of observations. Report complications of treatment. Give numbers of observations. Report losses to observation (such as dropouts from a clinical trial). References for the design of the study and statistical methods should be to standard works when possible (with pages stated) rather than to papers in which the designs or methods were originally reported. Specify any general-use computer programs used.

Put a general description of methods in the Methods section. When data are summarized in the Results section, specify the statistical methods used to analyse them. Restrict tables and figures to those needed to explain the argument of the paper and to assess its support.

Results

Present your results in logical sequence in the text, tables, and illustrations. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations.

Discussion

Emphasize the new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or

other material given in the Introduction or the Results section. Include in the Discussion section the implications of the findings and their limitations, including implications for future research. Relate the observations to other relevant studies.

Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not completely supported by the data. In particular, authors should avoid making statements on economic benefits and costs unless their manuscript includes economic data and analyses. Avoid claiming priority and alluding to work that has not been completed. State new hypotheses when warranted, but clearly label them as such. Recommendations, when appropriate, may be included.

In his seminal work on genre analysis Swales (1990) refers to the study of the IMRaD structure through what was is called *moves and steps*. Swales studied these features in the Introduction of research articles and this was the starting point to the proliferation of the study of other genres such as abstracts, or part-genres, such as the discussion, methodology or conclusion sections of experimental RAs. This emerged to provide the theoretical foundation of the three other sections that the conventional RAs own: Introduction-Method-Results-Discussion which is considered the default macro-structure of empirical RAs.

Sollaci and Pereira (2004) explain that the IMRaD structure was first used in 1940s in biomedical and health science publications. These authors further note that although IMRaD is the prevailing structural pattern, the texts do not always fully adhere to this macrostructure. Rather, they may exhibit minor structural variations, as there are sections in the texts that cannot be included in this IMRaD pattern but that are equally

important. Pérez-Llantada (2012) comments on the practical rationale underpinning this structure:

[t]he IMRaD structure facilitates modular reading, because readers usually do not read in a linear way but browse in each section of the article, looking for specific information, which is normally found in pre-established areas of the paper. (p. 56)

Other scholars have investigated the nature of a particular rhetorical section of the empirical RA. This is the case of studies on research article Introductions (e.g. Kanoksilapatham, 2005; Lin & Evans, 2011; Samraj, 2002; Swales, 1990), the Methods section (e.g. Kanoksilapatham, 2005 and Peacock & Flowerdew, 2011), the Results section (e.g. Basturkmen, 2009; Kanoksilapatham, 2005; Lim, 2010), and the Discussion section (e.g. Kanoksilapatham, 2005; Peacock & Flowerdew, 2001).

In this chapter the structural patterns of the 270 research articles compiled in the corpus are described and compared across the three language variables, ENG, SPENG and ELF. In discussing each variable I will also raise a number of issues of disciplinary variation (HAE, ONC and BIOQ).

3.1.1 Overall corpus findings

Broadly, the analysis of the corpus texts at a macro-rhetorical level showed that, although the IMRaD structure prevailed, all the texts exhibited minor structural variation

at this level, which supports previous claims reported earlier in the literature (Yang & Allison, 2003). In the case of the corpus texts selected for the present study, this was not an unexpected finding since biomedical research writing is expected to adhere to the ICAME conventions.

The analysis of the corpus texts exhibited overall uniformity, that is, homogeneity regarding structural patterning (Table 3.1). As seen in this table, the three sets of texts, no matter their language variable or disciplinary field that they represent, adhered to the standard IMRaD format, thus following the established ICAME protocol.

Table 3.1

Structural variations across language variables.

	Disciplinary field	No. of different rhetorical patterns
ENG	HAE	6
	ONC	7
	BIOQ	6
SPENG	HAE	4
	ONC	3

	BIOQ	5
ELF	HAE	6
	ONC	2
	BIOQ	5

It is interesting to note, though, as also shown in Table 3.1, that there does exist minor variation of IMRaD in the structural patterns identified in the ENG, SPENG and ELF texts, quantified in terms of number and comparative distribution of patterns. Table 3.2 lists these different structural patterns as well as their corresponding percentage of use in each set of corpus texts.

Table 3.2

Variants of macro-structural patterns in the corpus.

	Discipline	Macro-structural patterning variants	No. of texts	%
ENG	HAE	(I)-MATS&METS- (R)-DISC	11	36.6%
		(I)-METS-R-DISC	6	20%

		I-PATS,MATS&METS-DISC	5	16.6%
		I-MATS&METS- R-DISC	5	16.6%
		(I)-METS-R-DISC-CONCL	2	6.6%
		(I)-PATS&METS-R-DISC	1	3.3%
	ONC	I-M-R-DISC*	10	33.3%
		I-PATS&METS/ MATS&METS-R-DISC	8	26.6%
		I-M-R-D-CONCL	5	16.6%
		I-METS-DISC (R)	3	10%
		I-PATS&METS/ MATS&METS-R-DISC- CONCL	2	6.6%
		I-M-R-D (CONCL)	1	3.3%
		I-M-R-D-CONCL	1	3.3%
	BIOQ	I-R-DISC-EXPERIMENTAL	24	80%
		I-R&DISC-CONCLUSION- EXPERIMENTAL	2	6.6%

		I-R-DISC-C-EXPERIMENTAL	1	3.3%
		I-R&DISC-EXPERIMENTAL	1	3.3%
		I-R&DISC-CONCLUSION	1	3.3%
		I-R-DISC (E) (CONCL) *	1	3.3%
SPENG	HAE	(I)-M&M-RESULTS-DISCUSSION	15	50%
		I-M&M (PATS&METS)-RESULTS-D	13	43.3%
		(I)-M&M-RS-DISC-CONCLUSSIONS AND FUTURE DIRECTIONS	1	3.3%
		I-DESIGN&METHODS-R-DISC	1	3.3%
	ONC	I-PATS&METS/ MATS&METS-R-DISC	19	63.3%
		(I)-PATS&METS/ MATS&METS-R-DISC	10	33.3%
		(I)-MATS&METS-R-DISC-CONCL	1	3.3%
	BIOQ	(I)-R-DISC-EXPERIMENTAL	25	83.3%
		(I)-R&DISC-EXPERIMENTAL	2	6.6%
		I-THEORY-R&DISC-CONCLUDING	1	3.3%

		REMARKS			
		(I)-R&DISC-CONCLUSION	1	3.3%	
		(I)-DISC-CONCLUSION- EXPERIMENTAL	1	3.3%	
ELF	HAE	I-R-DISC- PATS,MATS&METS/MATS/PATS&MET S/METS	17	56.6%	
		I-MATS&METS-R-DISC-R-DISC	6	20%	
		I-PATS& METS-R-DISC	3	6.6%	
		I-MATS&METS-R-DISC-CONCLUSION	2	6.6%	
		I-R&DISC-DESIGN&METS	1	3.3%	
		I-METS-R-DISC	1	3.3%	
		ONC	I-PATS&METS/ MATS&METS-R-DISC	28	93.3%
		ONC	I-METS-R-DISC	1	3.3%
			I-M-R-D-CONCL	1	3.3%
		BIOQ	I-MATS&METS-R-DISC-C	16	53.3%

	I-MATS&METS-R-DISC	11	36.6%
	I-EXPERIMENTAL-R&DISC	1	3.3%
	I-METS-R-DISC	1	3.3%
	I-MATS&METS-R&DISC-C	1	3.3%

In the following subsections I summarize the main findings considering, first, the variable 'language' and, secondly, the variable 'discipline'.

3.1.1.1 Rhetorical variation across 'language' variables

As illustrated in the previous table, the most common structure in the texts representing the variable ENG in the disciplinary field of HAE was (I)-Mats & Mets-(R)-Disc. In this case, the lack of an 'Introduction' heading appeared to be a common trend. Yang and Allison (2003) observe the omission of the Introduction heading in RAs explaining that it was a way of complying with "[t]he specific macro-structural requirement of the APA style sheet (APA Manual, 2012, p. 155).

Other patterns used in these texts were I-MATS&METS-R-DISC and I-PATS,MATS&METS-DISC, hence exhibiting very little variation from default IMRaD. Both structures showed a very low percentage of use (16.6%). In the ENG-HAE texts, therefore, the conventional structure described by Swales (1990, 2004), IMRaD, was not found. In the texts representing the variable ENG-ONC the most frequently used

structure was (I)-PATS&METS/ MATS&METS-R-DISC (amounting to 33.3% of all patterns), followed by I-PATS&METS/MATS&METS-R-DIS (26.6%). In this case, both structures were very similar, the only difference being the presence or absence of an explicit heading for the Introduction section. In the ENG-BIOQ texts, the most recurring structure was I-R-DISC-EXPERIMENTAL amounting to 80% of the structures of all texts. In sum, none of the texts strictly adhered to the traditional IMRaD structure yet only very minor variations of this pattern was found.

If we turn to the texts representing the SPENG variable, the SPENG-HAE texts exhibited two main structures: (I)-M&M-R-DISC (used in half of all texts) and I-M&M (PATS&METS)-RESULTS-DISCS (used in circa 40% of all texts in this discipline). As for the first structural pattern, it can be noted that although materials and methods merged in a single section, it was strictly the IMRaD pattern described by Swales (1990, 2004) for experimental article writing. In the SPENG-ONC texts the most frequently used structural pattern was I-PATS&METS/ MATS&METS-R-DISC (representing 63.3% of all texts). Finally, in the SPENG-BIOQ texts, the prevailing pattern was (I)-R-DISC-EXPERIMENTAL (used in circa 85% of all texts).

The texts representing the variable ELF were also very uniform in terms of macrostructural information organization. In ELF-HAE almost 60% of the texts used the I-R-DISC-PATS, MATS&METS/MATS/PATS&METS/METS pattern. Only 20% exhibited the variant I-MATS&METS-R-DISC-R-DISC. The ELF-ONC texts generally followed the pattern I-PATS&METS/ MATS&METS-R-DISC (used in 87% of all texts). In the case of ELF-BIOQ, two structures recurred, the I-MATS&METS-R-DISC-C (used in approximately half of all texts) and I-MATS&METS-R-DISC (representing 26.6% of all texts).

Having captured a general view of the findings summarized previously, it can be deduced that the most common structural pattern shared by the sets of texts in the

three language variables is I-PATS&METS/MATS&METS-R. This seems to contradict what Yang and Allison (2003, pp. 365-385) have argued previously, that is, the inapplicability of the IMRAD structure to a great number of experimental RAs.

Table 3.3

Similarities and differences of structural patterns use across the 'language' variable.

Shared by ENG, SPENG, ELF	(I)/I-PATS&METS-R-D (HAE) I-METS-R-DISC (HAE) I-PATS&METS/MATS&METS-R-D (ONC) I-MATS&METS-R-D (BIOQ/HAE)
Shared by ENG and SPENG, not ELF	(I)/I-R-D-EXPERIMENTAL (BIOQ) (I)/I-R&D-CONCL (BIOQ) (I)/I-R&D-EXPERIMENTAL (BIOQ)
Shared by SPENG and ELF, but not ENG	I-METS-R-DISC (HAE) I-PATS&METS/MATS&METS-R-D (ONC) (I)/I-MATS&METS-R-D-CONCL (ONC)
Shared by ENG and ELF, but not SPENG	I-METS-R-DISC (HAE/ONC) I-M-R-D-C (ONC)

Table 3.4

Structures distinctive to each language variable.

ENG	<p>I-PATS,MATS&METS-DISC (HAE)</p> <p>(I)-METS-R-DISC-CONCL (HAE)</p> <p>I-R&DISC-CONCL-EXP (BIOQ)</p> <p>I-R-DISC-C-EXPERIMENTAL (BIOQ)</p> <p>I-R-DISC (E) (CONCL) * (BIOQ)</p>
SPENG	<p>I-THEORY-R&DISC-CONCLUDING REMARKS (BIOQ)</p> <p>I-DESIGN&METHODS-R-DISC (HAE)</p> <p>(I)-M&M-RESULTS-DISCUSSION-CONCLUSIONS AND FUTURE DIRECTIONS (HAE)</p> <p>(I)-DISC-CONCLUSION-EXPERIMENTAL (BIOQ)</p> <p>I-M&M (PATS&METS)-RESULTS-DISCS (HAE)</p>
ELF	<p>I-EXPERIMENTAL-R&DISC (BIOQ)</p> <p>I-R&DISC-DESIGN&METS (HAE)</p> <p>I-R-DISC PATS,MATS&METS/MATS/PATS&METS (HAE)</p> <p>I-EXPERIMENTAL-R&DISC (BIOQ)</p>

As can be seen in this table, the structural pattern described by Swales (1990) as prototypical is not strictly used as the distinctive structure in any of the language variables (ENG, SPENG and ELF). In ENG, the I-R-D structure prevails, although other patterns also have explicit sections (MATS & METHODS) in two out of the five structures. It is also relevant the Introduction section, that is also present in all structures except for one. In SPENG, IMRaD *per se* was not found but there are two structures that were not found in the texts from the other variables. These were I-THEORY-R&DISC-CONCLUDING REMARKS and I-DESIGN&METHODS-R-DISC. In ELF the texts mainly adhere to two distinctive structures I-EXPERIMENTAL-R&DISC and I-R-DISC PATS,MATS&METS/MATS/PATS&METS and with some minor variants. Patients, materials and methods sections are explicit sections.

3.1.1.2 Sub-disciplinary variation

Table 3.5 summarizes the main structural patterns found across the three disciplines.

Table 3.5

Structural variation across disciplines.

	Language	Macro-structural patterning variants	No. of texts	%
HAE	ENG	(I)-MATS&METS- (R)-DISC	11	36.6%
		(I)-METS-R-DISC	6	20%
		I-PATS,MATS&METS-DISC	5	16.6%
		I-MATS&METS- R-DISC	5	16.6%
		(I)-METS-R-DISC-CONCL	2	6.6%
		(I)-PATS&METS-R-DISC	1	3.3%
	SPENG	(I)-M&M-RESULTS-DISCUSSION	15	50%
		I-M&M (PATS&METS)-RESULTS-D	13	43.3%
		(I)-M&M-RS-DISC-CONCLUSIONS AND FUTURE DIRECTIONS	1	3.3%
		I-DESIGN&METHODS-R-DISC	1	3.3%

	ELF	I-R-DISC- PATS,MATS&METS/MATS/PATS&METS/METS	17	56.6%
		I-MATS&METS-R-DISC-R-DISC	6	20%
		I-PATS& METS-R-DISC	3	6.6%
		I-MATS&METS-R-DISC-CONCLUSION	2	6.6%
		I-R&DISC-DESIGN&METS	1	3.3%
		I-METS-R-DISC	1	3.3%
ONC	ENG	I-M-R-DISC*	10	33.3%
		I-PATS&METS/ MATS&METS-R-DISC	8	26.6%
		I-M-R-D-CONCL	5	16.6%
		I-METS-DISC (R)	3	10%
		I-PATS&METS/MATS&METS-R-DISC-CONCL	2	6.6%
		I-M-R-D (CONCL)	1	3.3%
	I-M-R-D-CONCL	1	3.3%	
SPENG	I-PATS&METS/ MATS&METS-R-DISC	19	63.3%	

		(I)-PATS&METS/ MATS&METS-R-DISC	10	33.3%
		(I)-MATS&METS-R-DISC-CONCL	1	3.3%
	ELF	I-PATS&METS/ MATS&METS-R-DISC	28	93.3%
		I-METS-R-DISC	1	3.3%
		I-M-R-D-CONCL	1	3.3%

BIOQ	ENG	I-R-DISC-EXPERIMENTAL	24	80%
		I-R&DISC-CONCLUSION-EXPERIMENTAL	2	6.6%
		I-R-DISC-C-EXPERIMENTAL	1	3.3%
		I-R&DISC-EXPERIMENTAL	1	3.3%
		I-R&DISC-CONCLUSION	1	3.3%
		I-R-DISC (E) (CONCL) *	1	3.3%
	SPENG	(I)-R-DISC-EXPERIMENTAL	25	83.3%
		(I)-R&DISC-EXPERIMENTAL	2	6.6%

		I-THEORY-R&DISC-CONCLUDING REMARKS	1	3.3%
		(I)-R&DISC-CONCLUSION	1	3.3%
		(I)-DISC-CONCLUSION-EXPERIMENTAL	1	3.3%
	ELF	I-MATS&METS-R-DISC-C	16	53.3%
		I-MATS&METS-R-DISC	11	36.6%
		I-EXPERIMENTAL-R&DISC	1	3.3%
		I-METS-R-DISC	1	3.3%
		I-MATS&METS-R&DISC-C	1	3.3%

Table 3.6

Number of structural variations across sub-disciplinary variables.

	Language	No. of different rhetorical patterns
HAE	ENG	6

	SPENG	4
	ELF	6
ONC	ENG	7
	SPENG	3
	ELF	2
BIOQ	ENG	6
	SPENG	5
	ELF	5

As can be seen, in the three sub-disciplinary fields the sets of texts belonging to ENG exhibited different patterns. This might initially lead us to assume that the small variation of patterns in the SPENG and ELF sets of text is linked to the fact that both sets of texts are L2 texts. However, this assumption does not seem to be valid as it is the specific journal conventions that appear to determine the macrostructural organization of these RAs. For example, the *American Journal of Haematology* recommends this structure. In the *American Journal of Biochemistry and Biotechnology*, the structure followed by the writers aligns to the journal publication guidelines is I-Mats & Methods-R-DISC-Concl, as can be seen in the following link of its web page (<<http://thescipub.com/journals/ajbb/instructions#mpom>>). It is only the ELF variant in the field of BIOQ that includes the use of the full structure (I-Mats & Methods-R-DISC-

Concl) that the *American Journal of Biochemistry and Biotechnology* establishes. Twenty-four texts out of thirty (80%) in the ELF set use this pattern, which indicates that the writers' choice of structural patterns to organize contents (information) adheres to – and is determined by – the journal conventions and not by discipline-specific conventions. On the other hand, in the ENG and SPENG sets of texts, the macro-structural organization established by the journal in the BIOQ disciplinary field differs slightly. In the case of SPENG, information on Mats & Methods merged in a single section, as can be seen in the following example:

Material and methods

Patients and donors

The basis of this study was 106 donor-patient sibling pairs undergoing conventional myeloablative allo-SCTs at the Hospital Clinic of Barcelona from 1995 to 2002. Donor and patient characteristics are given in Table 1. All donor-patient pairs were of Caucasian origin. All patients received standard supportive care, including isolation in high-efficiency particulate-air-filtered rooms and administration of prophylactic antimicrobials; these included oral ciprofloxacin (500 mg/12 h) until neutrophil count recovery, oral fluconazole (50 mg/d) until 2 months after transplantation, and acyclovir (250 mg/m²/12 h intravenously or 800 mg/12 h oral) if the patient had a herpes simplex virus positive serology, until 1 month after transplantation. Primary prophylaxis with itraconazole (200 mg/12 h) was given to patients with a second case of acute GVHD requiring steroids. Secondary prophylaxis with amphotericin B (0.3 mg/kg/48 h) was given to patients who had an IFI previous to transplantation. The Ethics Committee of the hospital

approved the study. All patients and donors consented to obtain peripheral blood samples. (SPENG HAE #9).

It has also been found the absence of Introduction, an important part in Swales structure IMRaD (1981). In the following example, we observe the title (Mannan-binding lectin pathway....) and immediately after, we find a first paragraph that it is known that is the introduction due to the things commented on it although it lacks of a label with such title.

Mannan-binding lectin pathway deficiencies and invasive fungal infections following allogeneic stem cell transplantation

Invasive fungal infection (IFI) is one of the most life-threatening complications after allogeneic stem cell transplantation (allo-SCT). Length of neutropenia, presence of graft-versus-host disease (GVHD), and steroid and/or other immunosuppressant treatments have been identified as important risk factors for developing IFI following allo-SCT. The importance of individual non-HLA encoded genetic variability in the development of infections recently has been recognized. Thus, polymorphisms of several genes, namely myeloperoxidase (MPO) and mannan-binding lectin (MBL) have been associated with a higher incidence of infections. (SPENG HAE 9)

The fact that the variable discipline does not appear to influence the choice of the rhetorical pattern supports Yang and Allison's (2003) claim that Methods, Results and Discussion currently tend to be merged into a single section labelled, e.g. Results and Discussion [RD], Method, Results and Discussion [MRD] and Method and Results [MR]. In the majority of the texts, the information on Patients, Materials and Methods

was also included in a single rhetorical section. In this case, the exception aligns with previous claims by Yang and Allison (2003), who report that the Results and Discussion section was treated as a subgroup of Results.

3.1.2 Summary and discussion of findings

According to the findings described above, the conventional IMRaD structure stands as the prevailing default organizational patterning, only exhibiting very minor variation. As stated previously, with the exception of some texts (the ELF and ENG texts which adhere to the structure proposed by the journal (a total of nine texts), the remaining structural patterns used combine the 'Methods' section with 'Materials' or 'Patients'. Thus, this information is given under the heading 'Methods'. In the ELF subcorpus, Results and Discussion sections sometimes coalesce (as also reported by Swales in 1990 and Yang & Allison, 2003, p. 366). This also occurred in SPENG, where the variants I-DESIGN&METHODS-R-DISC, I-M&M (PATS&METS)-RESULTS-DISCS and (I)-M&M-RESULTS-DISCUSSION-CONCLUSIONS AND FUTURE DIRECTIONS were used. Cargill and O'Connor (2009) also comment that the Results and Discussion [RD] section should be different in nature from the separate Results and Discussion sections. Finally, in the texts retrieved from the *Journal of Clinical Oncology* the most frequent macro-structural pattern was I-PATS&METS/ MATS&METS-R-DISC, which occurred in almost all the texts. The prevailing use of this rhetorical macrostructure in the three aforementioned language variables (ENG, SPENG and ELF) indicates that this is the structure that oncologists generally use, possibly because it has become the established journal convention. There is only one text that uses the conventional IMRaD in ELF ONC and six texts in ENG ONC. These results corroborate previous findings (Cargill & O'Connor, 2009; Lin & Evans, 2011) and support the view that the

original structure described by Swales (1990), 'default' IMRaD, is not exactly applied as such. Sections can appear in different order and/or merge.

A further finding that emerged from the analysis of each sub-disciplinary subcorpus is the fact that the Haematology and Oncology texts follow the highly frequent structural pattern previously mentioned (I-PATS&METS/MATS&METS-R-DISC). Yet, the percentages of use in HAE were distributed rather evenly, being less recurring in the ELF texts: ENG HAE 73.1%, SPENG HAE 93% and ELF HAE 33.2%. On the other hand, the percentages in Oncology in relation to the three variables were slightly more homogeneous: ENG ONC 66.5%, SPENG ONC 63.3% and ELF ONC 93.3%. It can thus be concluded that both sub-disciplinary fields tend to use the same structural pattern in the three language variables. On the other hand, what is interesting in this data is that in the Biochemistry texts, in both the ENG and SPENG variables the most prevalent structure is I-R-D-EXPERIMENTAL (80% in ENG and 83.3% in SPENG), while in the ELF subset of texts the discipline of BIOQ adheres to the structure I-M&M-R-(D) (which accounted for 79.9% of all texts).

While it is possible to argue that medical RAs conform rigidly to the IMRaD pattern at that particular juncture in the discipline's evolution, "unconventional" papers drawing on minor variations from the IMRaD pattern suggests that the conventional structure allows certain flexibility as regards RA organization, as also argued by Lin and Evans (2011, p. 151).

Cargill and O'Connor (2009) explain that IMRaD is typically used in RAs in the most relevant scientific journals such as *Nature* and *Science*, as it serves to highlight the significance of the new contributions or advances made by the researchers. It is clear that the use of IMRaD (Swales, 1990) has not been maintained over time and new combinations are used in high impact journals such as the ones found in the corpus of analysed. Indeed, the new combinations, such as "Materials & Methods", "Patients &

Methods” or, as another example, the absence of a heading for the Introduction prove to be acceptable for the journal editors and publishers. One can assume this is so because all the information stated by ICAME is included in the text, following the requirements for submission of papers.

In contrast, in disciplines belonging to the fields of the social sciences and the humanities Lin and Evans (2011) report that IMRaD is expanded with independent Literature Review (LR) and Conclusion (C) sections. Comparing their results with the results of the present corpus analysis, this is not the case of the sample of biomedical texts analysed. This may thus confirm that the conventions of biomedical writing are well-established and that all authors generally adhere to them. This hypothesis could further explain the relatively small deviation from IMRaD described in this chapter. Unlike the texts analysed by Lin and Evans (2011), the literature review of all the texts analysed in the present study is included in the Introduction sections, and this is done consistently in the three disciplines (HAE, ONC and BIOQ). Several examples are provided below:

INTRODUCTION

Thrombin-like enzymes belong to serine proteases and are characterized by their abilities to specifically hydrolyze fibrinogen to produce noncross-linked fibrins, which are more susceptible to the lytic action of plasmin than the thrombin-induced cross-linked clots. Current studies showed thrombin-like enzymes involving ancrod from *Agkistrodon rhodostoma* and defibrase from *Agkistrodon halys* and *Agkistrodon acutus*, caused patients only a modest increase in bleeding risk, showing they are of significant importance in the prevention and treatment of a wide range of thrombotic disorders.

Various thrombin-like enzymes from different species of snake venom have been isolated and partially characterized, since Esnoff discovered the first thrombin-like enzyme from *Agkistrodon rhodostoma* in 1967. However, the amount of these enzymes purified from snake venom are not sufficient for both biochemical and molecular biologic properties studies, thus large-scale production of them by microorganisms seem to be a good alternative. So far several thrombin-like enzymes including batroxobin, mucrosobin, pallabin and acutin have been produced in *E.coli* as inclusion bodies. In most cases, a fused 6xhis-tag was designed to facilitate purification process. The major problem with this strategy, however, is that this attached peptide tag may alter the folding of the protein and in turn change protein properties involving structural, physiological and pharmacological features. Therefore, to develop equally efficient purification approach is of biotechnological importance. Among affinity chromatographies, immunoaffinity chromatography is in principle of great value in that the corresponding antibody as ligand is of the highest affinity and selectivity to a given protein, either the natural one or the recombinant one. Compared with high-cost monoclonal antibodies, polyclonal antibodies like egg yolk antibody is of practical advantages to produce in large-scale.

Gloshedobin is a snake thrombin-like enzyme from the venom of *Gloydius shedaoensis*. We previously report its biosynthesis in *E.coli* and its purification by using a 6xhis-tag. Since His-tag is not favored from the point of view of high-level and soluble expression, we herein constructed a recombinant gloshedobin without His-tag and developed a novel IgY immunoaffinity chromatography for its purification in a higher activity yield. (BIO ELF BIOQ #1)

INTRODUCTION

Gaucher disease (GD) is a macrophage lipidosis caused by an autosomal recessive deficiency of lysosomal acid β -glucosidase (glucocerebrosidase, GBA). It is a progressive, multi-systemic disease that exhibits a highly heterogeneous phenotypic spectrum. Three major subtypes of GD have been described based on the absence (type 1) or presence of neurologic symptoms (types 2 and 3); the vast majority of patients exhibit the non-neuronopathic or type 1 form of the disease. GD occurs in all ethnic groups, but it is most prevalent in people of Ashkenazi Jewish ancestry with a prevalence of 1 in 450 compared with 1 in 40,000–60,000 in non-Jewish populations. Typical manifestations of type 1 GD result from accumulation of glucocerebroside-laden tissue macrophages (Gaucher cells) in bone marrow, liver, spleen, lungs, and the skeleton. Disease manifestations are highly heterogeneous with respect to overall disease severity as well as to patterns of organ involvement. The standard of care for type 1 GD after diagnosis is enzyme replacement therapy (ERT) with imiglucerase, as indicated, which is safe and effective in reversing or preventing most disease manifestations.

Because of its rarity many physicians lack familiarity with recognition and management of GD, making this patient population vulnerable to lack of access to timely and appropriate medical care. We conducted a questionnaire-based survey of patients with GD to determine their experiences with diagnosis and management and to evaluate the extent of diagnostic delays. A second survey was conducted to assess Hematology–Oncology specialists' (Hem–Oncs) awareness of GD. To examine the length of diagnostic delays and their consequences in

individual patients, we report a case series from a large Gaucher treatment center. We examined patient characteristics in this series to identify risk factors that increase vulnerability to diagnostic delays. Finally, we prospectively undertook opportunistic screening in a community-based Hem–Onc practice to determine if an opportunity exists in this setting for early detection and intervention of patients with type 1 GD. (BIO ELF HAE #2)

INTRODUCTION

Palliative care is an important part of many diseases, including Cancer, However, little is known on how the care itself and other factors during the palliative phase affect the bereaved intimates in a long-term perspective.

The loss of a child can be considered particularly stressful when the death is caused by a malignancy, the parents, in addition to suffering the loss, are usually exposed to the protracted physical and emotional suffering of the child.² When the disease is no longer curable, the parents may be particularly vulnerable, and the care given to the child may affect them even more. Children with cancer suffer from a number of symptoms during their last month of life, and the communication with the child may also affect the child's well-being A study of women who had lost their husband to cancer suggests that it was the late husband's psychological, rather than physical, symptoms that affected the spouse's long- term mental health the most. An investigation of women who had had a stillbirth showed that care-related factors affected the women's mental health 3 years after bereavement. Similarly, factors in the care of

children Care-Related Distress of Bereaved Intimates with cancer may affect the surviving parents' risk of long-term psychological distress.

When prioritizing efforts to improve care, we may be helped by the bereaved intimates in identifying the factors that affect them the most in a long-term perspective. We conducted a population-based, nationwide study to determine to what extent certain care-related stressors resulted in long-term distress in bereaved parents who lost a child to Cancer, (BIO ELF ONC #1)

More broadly, the findings of the rhetorical analysis further confirm the genre stability of the research article genre for biomedical research knowledge publication and dissemination purposes. All the studies reviewed and the present PhD findings, even if the corpus is small-scale, appear to provide additional evidence that the macrostructural patterns for organizing textual information are highly standardised in biomedical research writing. ICAME conventions tell authors exactly what to say and how to say it in each rhetorical section of the text (Introduction, Methods, Results, Discussion) and by this means they sustain the communicative purposes of the RA genre.

Adherence to the ICAME conventions can be attributed to the fact that publication of biomedical research takes place much faster than in other disciplinary fields such as the social sciences and the humanities. The pattern therefore serves to assist writers and facilitate the text-composing process. One can conclude that standardization and, more broadly, uniformity in publishing research, become useful ways of supporting and facilitating the writing process to all authors, no matter their L1 background or the sub-disciplinary field they belong to. In addition to this scaffolding purpose, standardization also contributes to maximizing informativity and readability, which is crucial for scientific

knowledge exchange and dissemination among native-English and non-native English-speaking researchers alike.

3.2. The phraseology of academic texts

From a theoretical standpoint, formulaic language has been conceptualized and described by the literature from three different approaches. These approaches are briefly summarized below. It should be noted though that it is only the frequency-based approach to phraseology the approach taken for conducting the phraseological analysis described in this section:

- ‘Phraseological’ approaches (e.g. Cowie, 1998) have focused on the non-compositionality of certain expressions, defining formulaicity in terms of either the degree to which the meaning of a word combination is predictable from the meaning of its parts or the degree to which words with similar meanings can be substituted into the phrase. Non-compositional phrases include idioms (e.g., *kick the bucket*, *spill the beans*) and certain collocations (e.g., *curry favour*, *French window*).
- ‘Frequency-based’ approaches (e.g. Biber, 2009; Hoey, 2005; Sinclair, 2004; Stubbs, 1995) focus on the tendency for certain linguistic combinations to appear with high frequency in text, defining formulas as strings of linguistic items (including words, parts of speech, and semantic fields), which have a statistical tendency to co-occur in corpora. Examples include high frequency collocations (such as *hard work*, as shown in Table N), colligations (e.g., *preposition + the naked eye*; *complement function + consequence*), semantic preferences (e.g., ‘words related to express’ + *true feelings*;

'words related to logic' + consequences), and semantic prosody (e.g., negative concept + happen; positive concept + provide).

- 'Psychological' approaches (e.g. Hoey, 2005; Wray, 2002) focus on the efficient mental processing and storage of language, defining formulas as strings of linguistic items which speakers remember and process as wholes, rather than constructing them 'online' with each use (see also Durrant & Mathews-Aydinli, 2011, p. 58).

The stock of phraseology studies carried out in the past decades has contributed significantly to the understanding of the importance of multi-word units in academic writing from the perspective of text-linguistic research. In his analysis of the *London-Lund Corpus* Altenberg (1998) stressed the significance of these units by claiming that 80% of the words in the corpus were recurrent word combinations. As Wray (2002, p. 9) observes, there was "a problem of terminology" in the description of word co-occurrence. On the one hand, it was used in different ways by different scholars and, on the other hand, several terms were used to refer to similar or even the same notion of word combination. For example, some of the terminology used to refer to phraseology includes 'recurrent word combinations' (Altenberg, 1998), 'lexical bundles' (Biber & Barbieri, 2007; Cortes, 2004), 'clusters' (Hyland, 2008), and 'n-grams' (Stubbs, 2007), inter alia. All these terms refer to continuous word sequences retrieved from texts through corpus-driven methods and according to several distribution criteria and a frequency cut-off point. The resulting sequences are considered fixed multi-word units that have customary pragmatic and/or discourse functions, used and recognized by the speakers of a language within certain contexts (Chen & Baker, 2010, p. 30).

Lexical bundles is perhaps the term most extensively used in today's phraseology research on academic writing. This term was first coined by Biber, Johansson, Leech, Conrad, and Finegan in the *Longman Grammar of Spoken and Written English* (1999).

Lexical bundles are defined as ‘the most frequently occurring lexical sequences in a register’ (Biber, Conrad & Cortes, 2004; Biber, Johansson, Leech, Conrad, & Finegan, 1999, p. 105). Bundles are therefore “recurrent expressions, regardless of their idiomaticity, and regardless of their structural status” (Biber et al., 1999, p. 990). The underlying rationale for a frequency of bundle use is the assumption that language users normally depend on a stock of prefabricated word chunks for a fluent linguistic production (Hoey, 2005; Sinclair, 1991). In addition to those already stated above, alternative terms used by the literature to refer to lexical bundles are “lexical phrases”, “routines”, “formulas”, “fixed expressions”, “prefabricated patterns” and “prefabs”) (Biber, Conrad & Cortes, 2003).

As stated earlier, the main indicator used by researchers to identify and define multi-word units in academic writing is ‘frequency’. In the *Longman Grammar of Spoken and Written English* (LGSWE) the concept of “lexical bundles” is defined as “combinations that recur at least ten times per million words and across five or more texts” (Biber et al., 1999, p. 994). Biber et al. (2003) propose an analytical framework to classify lexical bundles according to the discourse functions bundles perform (i.e. depending on whether they convey referential, text-organizing or stance meanings). This discourse approach to phraseology was only used exploratorily in this PhD.

Finally, it is worth stressing that in the context of academic writing in English as an international language, the main focus of this dissertation, ‘formulaicity’, or the knowledge of conventionalised multi-word combinations, has also become a relevant issue of scholarly enquiry from the perspective of language acquisition. The literature explains that it is something that even native English writers do not use as an innate ability (Granger & Meunier, 2008; Kachru, 2008, 2009; Wray, 2002). In this respect, the findings below were expected to provide insights into how and why both native and non-native English-speaking researchers used phraseological units in their RAs.

In the following section I provide a description of the phraseological profile of the texts in the three language variables, ENG, SPENG and ELF and describe the main similarities and differences in terms of recurring phraseology.

3.2.1 Overall findings

The corpus search retrieved a total of fifty-three three-word bundles in ENG, sixty-nine in SPENG and eighty-one in ELF, which suggests that phraseological units are a typical textual feature of the academic written register (Biber, 2004; Biber et al., 1999). The fact that SPENG and ELF both exhibited a broader repertoire of bundles may indicate that these two groups of writers might be drawing on a wider repertoire of lexical bundles for communicative purposes, which might possibly be attributed to the fact that the writers draw on lexico-grammatical templates when writing in English as an L2. These lexical bundles ease the writing of the RAs in journals in which the language used for the diffusion of the knowledge is English, such as the ones that have been included for this doctoral dissertation (*American Journal of Hematology*, *American Journal of Biochemistry* and *Biotechnology* and *Journal of Clinical Oncology*).

Table 3.7

List of 3-grams in ENG (HAE, ONC and BIOQ).

	Total occurrences		x 100,000
<i>the presence of</i>	237		77
<i>in the presence</i>	176		57
<i>the absence of</i>	149		49
<i>in the absence</i>	138		45
<i>shown in figure</i>	76		25
<i>the number of</i>	75		24
<i>the effects of</i>	73		24
<i>as well as</i>	70		23
<i>the effect of</i>	69		23
<i>been shown to</i>	68		22
<i>the role of</i>	62		20
<i>was used to</i>	58		19
<i>consistent with the</i>	56		18
<i>the ability of</i>	55		18
<i>is required for</i>	50		16
<i>has been shown</i>	47		15
<i>due to the</i>	43		14
<i>end of the</i>	43		14
<i>the percentage of</i>	43		14
<i>structure of the</i>	42		14
<i>the amount of</i>	42		14
<i>the rate of</i>	42		14
<i>we found that</i>	42		14

<i>in order to</i>	41	13
<i>as shown in</i>	40	13
<i>in this study</i>	40	13
<i>a number of</i>	39	13
<i>in addition to</i>	38	12
<i>to determine the</i>	38	12
<i>data suggest that</i>	37	12
<i>is consistent with</i>	37	12
<i>associated with the</i>	36	12
<i>as previously described</i>	35	11
<i>the fact that</i>	34	11
<i>the level of</i>	34	11
<i>the present study</i>	34	11
<i>the time of</i>	34	11
<i>in response to</i>	33	11
<i>an increase in</i>	32	10
<i>appears to be</i>	32	10
<i>by using the</i>	32	10
<i>are consistent with</i>	31	10
<i>observed in the</i>	31	10
<i>one of the</i>	31	10
<i>results suggest that</i>	31	10
<i>suggest that the</i>	31	10
<i>the use of</i>	31	10
<i>there was no</i>	31	10
<i>analysis of the</i>	30	10
<i>based on the</i>	30	10
<i>each of the</i>	30	10
<i>in the present</i>	30	10

<i>to that of</i>	30	10
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Table 3.8

List of 3-grams in SPENG (HAE, ONC and BIOQ).

	Total occurrences		x 100,000
<i>the presence of</i>	305		83
<i>in the presence</i>	160		43
<i>according to the</i>	141		38
<i>as well as</i>	131		36
<i>the absence of</i>	97		26
<i>the number of</i>	95		26
<i>it has been</i>	94		26
<i>the effect of</i>	84		23
<i>the use of</i>	82		22
<i>as shown in</i>	81		22
<i>in the absence</i>	77		21
<i>in order to</i>	76		21
<i>one of the</i>	75		20
<i>in response to</i>	70		19
<i>the present study</i>	67		18
<i>the role of</i>	65		18
<i>on the other</i>	64		17
<i>analysis of the</i>	63		17
<i>based on the</i>	63		17
<i>in the same</i>	63		17

<i>in this study</i>	63	17
<i>involved in the</i>	63	17
<i>the other hand</i>	63	17
<i>the percentage of</i>	62	17
<i>the time of</i>	60	16
<i>shown in fig</i>	59	16
<i>the fact that</i>	59	16
<i>at the time</i>	58	16
<i>was used to</i>	56	15
<i>was used as</i>	55	15
<i>were obtained from</i>	55	15
<i>due to the</i>	54	15
<i>was carried out</i>	54	15
<i>has been reported</i>	53	14
<i>in the present</i>	53	14
<i>as previously described</i>	52	14
<i>was observed in</i>	52	14
<i>related to the</i>	51	14
<i>in agreement with</i>	49	13
<i>been shown to</i>	48	13
<i>were carried out</i>	48	13
<i>is associated with</i>	47	13
<i>an increase in</i>	46	12
<i>the amount of</i>	46	12
<i>presence of the</i>	44	12
<i>to determine the</i>	44	12
<i>associated with a</i>	42	11
<i>has been shown</i>	42	11
<i>the development of</i>	42	11

<i>in all cases</i>	41	11
<i>increase in the</i>	39	11
<i>the results of</i>	39	11
<i>in our study</i>	38	10
<i>included in the</i>	38	10
<i>a total of</i>	37	10
<i>and in the</i>	37	10
<i>have shown that</i>	37	10
<i>obtained from the</i>	37	10
<i>was determined by</i>	37	10
<i>we found that</i>	37	10
<i>results suggest that</i>	36	10
<i>was used for</i>	36	10
<i>with respect to</i>	36	10
<i>a number of</i>	35	10
<i>in addition to</i>	35	10
<i>shown in figure</i>	35	10
<i>the addition of</i>	35	10
<i>the end of</i>	35	10
<i>were used to</i>	35	10

Table 3.9

List of 3-grams in ELF (HAE, ONC and BIOQ).

	Total occurrences	
	x 100,000	
<i>according to the</i>	141	57
<i>the presence of</i>	113	46
<i>as well as</i>	90	36
<i>in this study</i>	84	34
<i>the present study</i>	84	34
<i>in our study</i>	72	29
<i>the percentage of</i>	72	29
<i>the time of</i>	62	25
<i>the number of</i>	60	24
<i>one of the</i>	58	23
<i>the results of</i>	57	23
<i>the use of</i>	56	23
<i>the development of</i>	53	21
<i>the effect of</i>	52	21
<i>the incidence of</i>	51	21
<i>at the time</i>	50	20
<i>based on the</i>	50	20
<i>in the present</i>	48	19
<i>a total of</i>	46	19
<i>on the basis</i>	46	19
<i>the basis of</i>	46	19
<i>was used to</i>	44	18
<i>a result of</i>	43	17
<i>because of the</i>	43	17

<i>in the presence</i>	43	17
<i>after the first</i>	42	17
<i>compared with the</i>	42	17
<i>as a result</i>	41	17
<i>the end of</i>	41	17
<i>has been shown</i>	39	16
<i>an increase in</i>	37	15
<i>in terms of</i>	37	15
<i>there was no</i>	37	15
<i>was observed in</i>	37	15
<i>the absence of</i>	36	15
<i>was defined as</i>	36	15
<i>due to the</i>	35	14
<i>increase in the</i>	35	14
<i>the date of</i>	35	14
<i>to evaluate the</i>	35	14
<i>been shown to</i>	34	14
<i>in the study</i>	34	14
<i>has been reported</i>	32	13
<i>in order to</i>	32	13
<i>as shown in</i>	31	12
<i>found to be</i>	31	12
<i>included in the</i>	31	12
<i>it has been</i>	31	12
<i>shown in table</i>	31	12
<i>the level of</i>	31	12
<i>the rate of</i>	31	12
<i>the role of</i>	31	12
<i>was carried out</i>	31	12

<i>are shown in</i>	30	12
<i>associated with the</i>	30	12
<i>between the two</i>	30	12
<i>observed in the</i>	30	12
<i>of the study</i>	30	12
<i>the amount of</i>	30	12
<i>the study was</i>	30	12
<i>with respect to</i>	30	12
<i>a number of</i>	29	12
<i>in the absence</i>	29	12
<i>the majority of</i>	29	12
<i>difference in the</i>	27	11
<i>have been reported</i>	27	11
<i>on the other</i>	26	10
<i>the other hand</i>	26	10
<i>was found to</i>	26	10
<i>a decrease in</i>	25	10
<i>all of the</i>	25	10
<i>most of the</i>	25	10
<i>there was a</i>	25	10
<i>be due to</i>	24	10
<i>in the same</i>	24	10
<i>the expression of</i>	24	10
<i>the fact that</i>	24	10
<i>the most common</i>	24	10
<i>was obtained from</i>	24	10
<i>was used as</i>	24	10

According to the literature, the most frequent bundles are those that occur “over 200 times per million of words” (Hyland, 2008, p. 6) in large-scale corpora. As can be seen in the tables above, in the corpus used in the present study frequency was calculated every 100,000 words. It was found that in ENG a three-word bundle such as *in the presence of* occurred 237 times in ENG, 305 times in SPENG and 141 times in the ELF subcorpus. Other 3-grams such as *according to the*, *the presence of*, *in the presence*, *the absence of*, *in the absence* or *the number of*, that also scored high frequencies of use, occurred with similar frequencies in other studies on bundles (Ädel & Erman, 2012; Biber et al., 1999; Cortés, 2004; Pérez-Llantada, 2014). From a structural viewpoint, all these are phrasal bundles, that is to say, they are sequences formed by a Noun Phrase (NP) or part of Noun Phrase (Part-NP), or a Prepositional Phrase (PrepP) or part of a Prepositional Phrase (Part-PrepP). This is consistent with previous studies on bundles in the academic written register.

Biber et al. (1999) state that approximately 50% of the high-frequency bundles are phrasal sequences. In the present analysis, this statement remains valid. Over 50% of all bundles in both ENG, SPENG and ELF (respectively) were phrasal bundles. The majority of the highest frequency bundles were all phrasal structures. The remaining bundles were clausal bundles constituting “parts of noun phrases and prepositional phrases” (Biber et al., 1999, p. 991) that extend across structural units. Complete structural forms (for example, *on the other hand*, *at the same time*, *in the present study*) in L1 English, or structures such as *on the other hand*, *at the same time*, *on the one hand*, *for the first time* or *as can be seen* in L2 English exemplify this point.

It is also worth noting that in the three sets of texts, the phrasal bundles were part of noun phrases and prepositional phrases and most of the structures found in SPENG also occurred in ELF such as *according to the*, *as well as*, *the presence of*, *based on the*, *as shown as*. From the tables above it can also be seen that some three-word bundles become highly frequent extended four-word bundles in the three sets of texts.

This was the case of n-grams such as *(has) been shown (to)*, *(at) the end of*, *(on) the other (hand)* or *(is) one of the*.

In her comparative study of history and biology RAs, Cortes (2004) argues that the use of core bundles can be indicative of a proficient level of language use. From the perspective of SLA, Ellis (2008) maintains that the core inventory of SERAC appears to indicate that writers must be using these bundles so frequently because they have memorized and routinized these language sequences. Pérez-Llantada (2014) explains that this may be so as a result of incidental learning through, e.g., extensive reading of similar texts, a practice that the scholars interviewed for the present study also reported (see Chapter 4). As reported in the following chapter, the scholars explained that they tended to pick up recurring phraseology and learn expressions (“set phrases”, in their own words, because they thought that the use of this language might make it easier to get published in a journal in the belief that mastery (or at least, confident use of) the recurring phraseology) reflects proficient native-English language use. Put together, these arguments may explain why some high frequency bundles are used in the three sets of texts, ENG, SPENG and ELF. I further elaborate on this in the following subsections.

3.2.2 Shared and non-shared bundles across language variables

From the overall findings above it should be stressed, as just stated, that some of the recurring word combinations (n-grams) occur in the three sets of texts, ENG, SPENG and ELF. This was the case of n-grams such as *the presence of the*, *in the presence of*, *the absence of the*, *in the absence of* and *the number of the*. Table 3.10 lists the frequency ranks of shared bundles in the three sets of texts.

Table 3.10

Three-grams shared by ENG, SPENG and ELF (in rank order of frequency).

ENG	SPENG	ELF
<i>the presence of</i>	<i>the presence of</i>	<i>the presence of</i>
<i>in the presence</i>	<i>in the presence</i>	<i>as well as</i>
<i>the absence of</i>	<i>as well as</i>	<i>in this study</i>
<i>in the absence</i>	<i>the absence of</i>	<i>the present study</i>
<i>the number of</i>	<i>the number of</i>	<i>the percentage of</i>
<i>as well as</i>	<i>the effect of</i>	<i>the time of</i>
<i>the effect of</i>	<i>the use of</i>	<i>the number of</i>
<i>been shown to</i>	<i>as shown in</i>	<i>one of the</i>
<i>the role of</i>	<i>in the absence</i>	<i>the use of</i>
<i>was used to</i>	<i>in order to</i>	<i>the effect of</i>
<i>has been shown</i>	<i>one of the</i>	<i>based on the</i>
<i>due to the</i>	<i>the present study</i>	<i>in the present</i>

<i>the percentage of</i>	<i>the role of</i>	<i>in the presence</i>
<i>the amount of</i>	<i>based on the</i>	<i>has been shown</i>
<i>in order to</i>	<i>in this study</i>	<i>an increase in</i>
<i>as shown in</i>	<i>the percentage of</i>	<i>the absence of</i>
<i>in this study</i>	<i>the time of</i>	<i>due to the</i>
<i>a number of</i>	<i>the fact that</i>	<i>been shown to</i>
<i>the fact that</i>	<i>was used to</i>	<i>in order to</i>
<i>the present study</i>	<i>due to the</i>	<i>as shown in</i>
<i>the time of</i>	<i>in the present</i>	<i>the rate of</i>
<i>an increase in</i>	<i>been shown to</i>	<i>the role of</i>
<i>one of the</i>	<i>an increase in</i>	<i>the amount of</i>
<i>the use of</i>	<i>the amount of</i>	<i>a number of</i>
<i>based on the</i>	<i>has been shown</i>	<i>in the absence</i>
<i>in the present</i>	<i>a number of</i>	<i>the fact that</i>

This table shows that the three sets of texts share a total of twenty-six bundles. Following Pérez-Llantada's (2014) terminology, these bundles can be taken to be 'core bundles' used very frequently in all the corpus texts. These core bundles represent almost 50% of all bundles in ENG, 38% of all bundles in SPENG and 32% of all bundles in ELF. Their high frequency of use indicates that these bundles are extremely useful to writers to convey certain discourse meanings. Close reading of the texts reveals that these core bundles perform the following functions at a discourse level:

- referential functions (bundles that help writers "structure their experience and determine their way of looking at things" (Cortes, 2004, p. 401)). For example, *the time of* (indicating time), *the present study* or *in this study* (signalling textual reference), or *one of the* (quantifying entities) occurred in the three sets of texts, and across the three sub-disciplinary fields.
- text-organising functions ("used to express textual functions which are concerned with the meaning of the sentence as a message in relation to the surrounding discourse" (Cortes, 2004, p. 401)). For example, *the fact that* (reflecting relationships between preceding or upcoming text) or *the result of* (conveying identification-focus and inferential meanings) also occurred in the three sets of texts, and across the three sub-disciplinary fields.

The following are some examples of these core bundles in context:

Compared with mammalian animals, hens are excellent alternatives to generate polyclonal antibodies in that: 1) relatively inexpensive chicken

housing, 2) non-stressful to hens for egg collection and 3) fast and simple isolation of IgY antibodies. In addition, **the fact that** yolk immunoglobulins do not activate mammalian Fe receptors, which could mediate inflammatory response in the gastrointestinal tract, makes IgY antibodies very attractive for peroral immunotherapy. (BIO ELF BIOQ #1).

In this study, we investigated the nature of AT deficiency in four Japanese female patients with thrombotic complications during pregnancy, and identified four distinct mutations including two novels in the AT gene, which might be responsible for discrete phenotypes of AT deficiency. (BIO ELF HAE #1)

These differences confirmed the plasticity of these proteins and their capacity to change secondary structure as **the result of** interacting with substrates, as we observed here for PKC ϵ . (BIO SPENG BIOQ #21)

To examine the role of the different phases of JNK activation in IL-6 gene expression, we investigated the effect of changing **the time of** addition of the drug 1NM-PP1 (Figure 4D). (BIO ENG BIOQ #30)

Other n-grams occur only in ENG and SPENG or only in ENG and ELF or in SPENG and ELF. Table 3.11 summarizes the three lists of shared bundles.

Table 3.11

N-grams shared by ENG and SPENG only, ENG and ELF only and SPENG and ELF only (in rank order of frequency).

ENG and SPENG only		ENG and ELF only		SPENG and ELF only	
<i>was used to</i>	<i>in response to</i>	<i>the absence of</i>	<i>the percentage of</i>	<i>according to the</i>	<i>according to the</i>
<i>the percentage of</i>	<i>analysis of the</i>	<i>was used to</i>	<i>was used to</i>	<i>it has been</i>	<i>in our study</i>
<i>in addition to</i>	<i>the percentage of</i>	<i>the percentage of</i>	<i>there was no</i>	<i>on the other</i>	<i>the percentage of</i>
<i>data suggest that</i>	<i>was used to</i>	<i>the rate of</i>	<i>the absence of</i>	<i>in the same</i>	<i>the results of</i>
<i>as previously described</i>	<i>as previously described</i>	<i>associated with the</i>	<i>the level of</i>	<i>the other hand</i>	<i>the development of</i>
<i>in response to</i>	<i>to determine the</i>	<i>the level of</i>	<i>the rate of</i>	<i>the percentage of</i>	<i>at the time</i>

<i>results suggest that</i>	<i>results suggest that</i>	<i>observed in the</i>	<i>associated with the</i>	<i>at the time</i>	<i>a total of</i>
<i>analysis of the</i>	<i>in addition to</i>	<i>there was no</i>	<i>observed in the</i>	<i>was used to</i>	<i>was used to</i>
<i>we found that</i>	<i>we found that</i>			<i>was used as</i>	<i>the end of</i>
				<i>was carried out</i>	<i>was observed in</i>
				<i>has been reported</i>	<i>increase in the</i>
				<i>was observed in</i>	<i>has been reported</i>
				<i>were carried out</i>	<i>included in the</i>
				<i>the development of</i>	<i>it has been</i>
				<i>increase in the</i>	<i>was carried out</i>
				<i>the results of</i>	<i>with respect</i>

	<i>to</i>
<i>in our study</i>	<i>on the other</i>
<i>included in the</i>	<i>the other hand</i>
<i>a total of</i>	<i>in the same</i>

As can be seen in the table above, the subsets ENG and SPENG share a total of nine bundles, ENG and ELF a total of eight bundles. SPENG and ELF share a total of twelve bundles.

Table 3.12

Distinctive bundles of each language variable (in rank order of frequency).

ENG only	SPENG only	ELF only
<i>the absence of</i>	<i>it has been</i>	<i>the results of</i>
<i>shown in figure</i>	<i>on the other</i>	<i>the development of</i>
<i>the effects of</i>	<i>in the same</i>	<i>the incidence of</i>
<i>consistent with the</i>	<i>involved in the</i>	<i>at the time</i>
<i>the ability of</i>	<i>the other hand</i>	<i>a total of</i>
<i>is required for</i>	<i>shown in fig</i>	<i>the basis of</i>

<i>end of the</i>	<i>at the time</i>	<i>a result of</i>
<i>structure of the</i>	<i>was used as</i>	<i>because of the</i>
<i>the rate of</i>	<i>were obtained from</i>	<i>after the first</i>
<i>to determine the</i>	<i>was carried out</i>	<i>compared with the</i>
<i>is consistent with</i>	<i>has been reported</i>	<i>as a result</i>
<i>associated with the</i>	<i>was observed in</i>	<i>the end of</i>
<i>the level of</i>	<i>related to the</i>	<i>of the disease</i>
<i>appears to be</i>	<i>in agreement with</i>	<i>in terms of</i>
<i>by using the</i>	<i>were carried out</i>	<i>was observed in</i>
<i>are consistent with</i>	<i>is associated with</i>	<i>was defined as</i>
<i>observed in the</i>	<i>presence of the</i>	<i>increase in the</i>
<i>suggest that the</i>	<i>associated with a</i>	<i>the date of</i>
<i>there was no</i>	<i>the development of</i>	<i>to evaluate the</i>
<i>each of the</i>	<i>in all cases</i>	<i>in the study</i>
<i>to that of</i>	<i>increase in the</i>	<i>has been reported</i>
	<i>the results of</i>	<i>found to be</i>
	<i>included in the</i>	<i>included in the</i>
	<i>a total of</i>	<i>it has been</i>
	<i>and in the</i>	<i>shown in table</i>
	<i>have shown that</i>	<i>was carried out</i>
	<i>obtained from the</i>	<i>are shown in</i>
	<i>was determined by</i>	<i>between the two</i>
	<i>was used for</i>	<i>of the study</i>

<i>with respect to</i>	<i>the study was</i>
<i>the addition of</i>	<i>with respect to</i>
<i>the end of</i>	<i>the majority of</i>
<i>were used to</i>	<i>difference in the</i>
	<i>have been reported</i>
	<i>on the other</i>
	<i>the other hand</i>
	<i>was found to</i>
	<i>a decrease in</i>
	<i>all of the</i>
	<i>most of the</i>
	<i>there was a</i>
	<i>be due to</i>
	<i>in the same</i>
	<i>the expression of</i>
	<i>the most common</i>
	<i>was obtained from</i>
	<i>was used as</i>

It is also worth noting that across the three language variants (ENG, SPENG and ELF) and across the three sub-disciplinary fields (HAE, ONC and BIOQ), the recurring bundles frame referential, text-organizing and stance meanings across the different rhetorical sections of the articles. A further finding is that, across the three sub-disciplinary field, stance bundles are most frequently used in the Discussion sections

of the ENG texts, where claims are discussed and authors build arguments to persuade readers of the validity of their claims. Examples of these stance bundles in the ENG texts are bundles containing semimodal auxiliaries and epistemic lexical verbs (e.g. *suggests that the, appears to be*). In the case of the SPENG and ELF texts, cause-effect and reason-result markers (*because of the, the result of, be due to*) exhibit higher frequencies of use than in the ENG texts.

When looking at the use of phraseology across rhetorical sections, it is very unlikely to find these different stance markers in other rhetorical sections such as the article introduction sections. The following examples illustrate these points:

Recent studies **have shown that** impaired regulation of Wnt-antagonists such as sFRP, Wif-1, Hdpr-1 and Dkk-3 by promoter hypermethylation is present in several human malignancies 12¹⁷. (BIO SPENG HAE #1) (Introduction)

Because of the strong stimulus on skin and mucosa, it will cause edema and blistering on the skin and make the patients feel pain and vomit if the crude drug is taken orally. So the Pharmacopoeia of the People's Republic of China has specified that Semen sinapis Albae should be processed by traditional stir-baked method before use. (BIO ELF BIOQ #7) (Introduction)

Amperometric sensors using immobilized xanthine oxidase **have been reported** and have shown effectiveness and selectivity for the measurement of hypoxanthine. (BIO ELF BIOQ #10) (Introduction)

As shown in Figure 4A for 4 representative samples and quantitated for all 6 patients studied, CXCL12 significantly enhanced MMP-9 secretion **with respect to** untreated cells. (BIO SPENG HAE #2). (Results)

We also tested **the effects of** WHI5 deletion in a swi4 background, and we were somewhat surprised to see detectable effects (Table 1), as one model predicted little effect because Swi4 appears to be the main target of the repressive effect of Whi5 (Costanzo et al. 2004; de Bruin et al. 2004). (BIO ENG BIOQ #5) (Results)

The results of activity versus time in submerged and solid media cultures are indicated in Fig. 3. Since the activity reaches its maximum after 10-15 days in rotary submerged cultures, this period was used to harvest cultures for preparation of crude extract for use in future investigations. (BIO ELF BIOQ #2) (Results)

Studies on Skp and prefoldin **suggest that the** hydrophobic elements responsible for pairing helices into coiled coils also promote interaction with substrate molecules (Martin et al.2004). (BIO ENG BIOQ #9) (Results and Discussion)

There was no previous high-resolution structural information for these three H/ACA proteins from any organism. As expected, Cbf5 exhibits overall structural homology to the E. coli pseudouridine synthase TruB (Figure 2,

Protein Data Base [PDB] number 1K8W, rmsd 1.3 Å for 191 Ca atoms; PDB number 1R3E, rmsd 1.4 Å for 184 Ca atoms). (BIO ENG BIOQ #11) (Results and Discussion)

This is consistent with the previous observation that the RxDL motifs of MC159 play important roles in MC159 function (Garvey et al. 2002a). (BIO ENG BIOQ #1) (Discussion)

This observation **is consistent with** only modest reductions in the binding affinity for the U9C (3.3-fold) and U9A (1.4-fold) substitutions (Figure 5C). (BIO ENG BIOQ #2) (Discussion)

The intermolecular hydrogen bond to the hydroxyl of Y24 **appears to be** important, as binding is reduced from 761 nM in the wild-type La NTD to >500 nM in the Y24A mutant, and no detectable binding affinity is observed for the Y24F mutant (Figure 4B). (BIO ENG BIOQ #2) (Discussion)

Edelfosine has been shown to induce cell killing in MM cells resistant to doxorubicin, melphalan, mitoxantrone, VP-16, cytoxan, and vincristine 48, and perifosine **has been reported** to be cytotoxic to MM cells resistant to dexamethasone and melphalan 49. (BIO SPENG HAE #4) (Discussion)

The results of our study show that independent genetic factors from both donors and recipients play an important role in the outcome of HLA-matched sibling bone marrow transplantation. (BIO SPENG HAE #9) (Discussion)

As a result of the study with the differential display, we found the increased expression of the activator protein of GM2 ganglioside, in macrophages and confirmed the increased level of mRNA quantified by using real-time TaqMan RT-PCR assay. (BIO ELF BIOQ #11) (Discussion)

As demonstrated **in the study**, IC50 AnnV-D39's inhibition activity to ADP induced platelet aggregation is about 308nmol/L, which is slightly lower than that of natural Decorsin (about 500nmol/L). (BIO ELF BIOQ #8) (Discussion)

As a result **of the study** with the differential display, we found the increased expression of the activator protein of GM2 ganglioside, in macrophages and confirmed the increased level of mRNA quantified by using real-time TaqMan RT-PCR assay. (BIO ELF BIOQ #11) (Discussion)

It was found that at all pH values tested, alpha-crystallin prevented the aggregation of heat-stressed beta-lactoglobulin and this effect increased with increasing pH. Incomplete suppression of protein aggregation and precipitation by alpha-crystallin implies that the aggregation of beta-

lactoglobulin occurs as **a result of** intermolecular disulphide bond polymerization. (BIO ELF BIOQ #23) (Discussion)

In our study, mean apolipoprotein B level **was found to** be strongly and independently associated with CAD and in multivariate analysis apo B was a stronger predictor of risk in CAD patients. (BIO ELF BIOQ #15) (Discussion)

Intravascular fibrin deposition was shown in hypoxia and it was suggested that this might **be due to** increased fibrin formation and decreased lysis, i.e., activated coagulation and depressed fibrinolysis as observed in RDS. (BIO ELF HAE #13) (Discussion)

Finally, it is also worth noting that there also seems to exist certain variation in the expression of epistemic meanings. In the case of the SPENG authors, Spanish has a smaller repertoire of modal verbs compared to the English modality system (Vázquez, 2010, p. 84). The fact that the SPENG authors do not use high frequency bundles incorporating modal verbs or semi modals might be attributed to such difference in the English and Spanish language systems.

3.2.3 Summary and discussion of findings

Hyland (2005) defines 'genre' as "a term for grouping texts together, representing how writers typically use language to respond to recurring situations" (p. 87). The findings of

the analysis shows that the L2 English writers (i.e. the authors of both the SPENG and ELF texts) tend to draw, in part, on a similar repertoire of bundles to that used by the ENG writers. Evidence lies in the list of shared bundles (core bundles) found in the corpus. As described earlier, the listed core bundles mainly served to perform referential and text-organising functions in the discourse, hence facilitating information processing and maximizing the informativity of the discourse.

The presence of core bundles, shared by the three sets of texts, might indicate, as Pérez-Llantada (2014) explains, that the writers have memorised these language sequences and then tend to employ them when they write RAs in English. In the case of the SPENG writers, and considering the findings reported in Chapter 4, it appears that they must have acquired these core bundles, not through explicit instruction (because the researchers did not report that they received academic writing instruction), but rather through reading and awareness of those ‘set phrases’ in other journal RAs. We could argue that the L2 English writers hence exhibit “competent idiomatic production” (Wray, 2002, p. 88) in these core bundles.

Considering the description of the discourse functions that these recurring bundles perform (mainly, referential and text-organising functions), we can agree with Biber and Barbieri’s (2007, p. 265) claim that the distinct sets of sequences used by the writers, no matter their language and the disciplinary field they belong to, are associated with typical communicative purposes. The recurring n-grams of the lists shown above indicate that these bundles are associated to typical communicative purposes: indicating referential meanings, indicating readers the textual organization of the discourse and, in the case of stance bundles, expressing an opinion or an evaluation of propositional content.

The combination of corpus-driven and corpus-based approaches to textual analysis was also useful to identify correlations between the rhetorical and the phraseological

levels of textual analysis, an area that should be further addressed in greater detail in future research.

The findings also show that the SPENG and the ELF writers seem to have adopted the recurring lexico-grammatical choices used in impact journal RAs, yet these authors appear to retain some preferred ways of constructing the argumentative flow, for example, through n-grams such as *as a result*, *a result of*, *due to the*, *be due to*, *because of the*, etc., as also noted earlier in the literature. This finding supports Hyland's (2005) observation that "different discourse strategies reflect different authorial positionings towards arguments and different ways of constructing a dialogic space for writer-reader interaction" (p. 44).

The use of distinctive (non-core) bundles suggests that the variable language might be shaping the discourse semantics of the texts in different ways. As noted above, only the ENG texts exhibited the use of two recurring epistemic bundles (e.g. *appears to be*, *suggests that the*), which was not the case of the SPENG and ELF texts. The presence of these bundles, most marked in the Discussion Section of the RAs, might be indicative that the discourse of the ENG is more tentative than that of the other two sets of texts. This finding would be in agreement with previous findings that have claimed that the expression of tentativeness through semi-modals and epistemic modal verbs such as *appear* and *suggest* in Anglophone writing is different from the expression found in non-Anglophone writing. Kerans (2002) notes that "differences in discourse modulation" (p. 42) are attributed to the fact of writing in English as a second language and must be transferring their L1 pragmatics to English as an L2 (for further discussion on stance in biomedical writing, see also Carciu, 2009, 2013).

Seminal studies in learner corpus research (e.g. Granger & Meunier, 2008) maintain that the use of L1 norms in learning an L2 can be traced through the analysis of L2 phraseology use. As these authors explain, the reason is that some of the formulaic

expressions are not used appropriately by the non-native English-speaking writers. With the data gathered in the present analysis, there does not seem to be any evidence to believe that the use of phraseology is inappropriate (e.g. semantic misuse, pragmatic inappropriacy, lack of register awareness). Rather, although the repertoires of bundles are slightly different, the texts in the three language variables exhibit a rather similar phraseological profile, again pointing at textual homogeneity, as also happened with the case of macro-structural organisation.

According to the literature (e.g. Schmitt, 2004), non-native users of English language memorise language sequences and acquire them through practice. This might be the case of the SPENG and ELF writers, and also the case of the researchers interviewed in Chapter 4 in this PhD, who reported that they generally tended to draw on set phrases to write up research in English-medium journals.

Johns (1999) state that writers' interaction is established with other members of different communities and, thus, "the rhetorical preferences of these communities provide writers with different sets of options for constructing both themselves and their readers" (p. 238). Stance is the ways that writers intrude into texts to stamp their personal authority onto their arguments or, alternatively, to step back from their discourse. This writer's disciplinary "voice" or personality includes the ways they present themselves to convey their judgments, opinions, and commitments to what they say. Essentially, stance is constructed through *n*-grams that include hedges (e.g., might, possibly, perhaps), boosters (undoubtedly, certainly) self-mention (I, we) and attitude markers (interesting, clear, sophisticated) (see also Vázquez, 2010; Vázquez Orta & Giner Alonso, 2008). Engagement is the other side of the coin, where writers 'recognize' the presence of their readers and create proximity with them through linguistic resources.

The analysis also showed that the different discourse functions of epistemic markers lend credence of the existence of “distinctive academic face-phenomena” (Duszak, 1994), ‘academic Englishes’ (Mauranen et al., 2010) or ‘interdiscursive hybridity’ (Pérez-Llantada, 2012, 2013, 2014) (see also Kachru, 2009; Kerans, 2002; Kourilová, 1998, among others).

From a genre analytical perspective, it could be argued that both the high degree of standardization that the texts exhibit at both rhetorical and phraseological levels indicates that no matter their language variable or the disciplinary variable they represent, the texts instantiate that the journal article genre is a “stabilised-for-now or stabilised-enough” (Schryer, 1994) means of social interaction within the biomedical community.

In the particular context of biomedical writing, Luzon Marco (2000) also contends that medical research papers exhibit particular linguistic patterns, as seen (sic.) “in the use of collocational frameworks, or discontinuous sequences of words, and the intermediate words, or collocates” (p. 63). Like Luzon Marco’s, the present chapter reveals the usefulness of corpus analysis to identify the lexicogrammatical patterns favoured by a specific genre, namely, the journal article.

On a final note, Hyland (2015) refers to “Participation: community and expertise”, where he takes up again the global/local dichotomy, this time from the perspective of the researchers’ participation in global and local networks. Developing community-located expertise should the learning and mastering of the genre-specific conventions (that is, the specific writing literacy, cf. Johns, 1999), and, in particular, given the findings regarding the expression of stance in academic writing, “the ability to balance a personal stance or identity against the demands and expectations of the professional discourse community” (p. 99). Such expertise will eventually be reflected in the text-construction process.

6.1 Summary of findings

The main aim of this dissertation was to understand the role and functions of English as an international scientific language and, in particular, its status as a language for research publication purposes. In what follows I briefly summarize the main findings from the three analytical perspectives used (textual, ethnomethodological and ethnographic) and provide several concluding remarks, implications from the findings and, finally, areas for future research.

6.1.1 Findings of the textual analysis

The first broad research question was *What are the rhetorical and phraseological features of texts written in English by L2 English Spanish-based researchers in the biomedical field? What are the similarities and differences of these L2 English texts compared to texts written by L1 English writers and L2 English researchers (other than Spanish researchers) in this field?* (RQ1).

The corpus findings showed that research writing in the biomedical field mainly draws on the specific conventions for this particular disciplinary field (i.e. the Vancouver conventions established by the International Committee of Medical Journal Editors). It

was shown that journal articles, no matter the language variable they belong to (ENG, SPENG and ELF), all tended to adhere to the macrostructural organization of empirical research articles described by the literature (Swales, 1990, 2004). Neither the discipline variable nor the language variable appeared to influence the writers' choice of macro-structural patterns for information organization.

Corpus data showed that although the prototypical Swalesian structure (1990) IMRaD tends to be the general pattern and, as seen in Chapter 3, the texts exhibited minor rhetorical variation. The need to adhere to the ICAME conventions may be attributed to the fact that biomedical research advances and knowledge dissemination and, subsequently, publication in biomedical journals takes place at a much faster pace than it does in other disciplinary fields such as e.g. the social sciences and the humanities. Medical journals generally publish on a monthly basis, but this is not the case of scientific journals in other disciplinary domains. To support the writing process, ICAME informs scholars what to write and how to do it in each section of the research article (Introduction, Methods, Results, Discussion) with a view to maximizing the communicative effectiveness of the texts.

As illustrated in this PhD, researchers in the biomedical field prove to use standardized language and information organization conventions. The Vancouver protocol for writing of manuscripts submitted in biomedical journals, established by the ICAME serves as a useful scaffold for organizing information when communicating new scientific knowledge to the international scientific community.

In the introduction of this PhD it was mentioned that approximately 80% of the journals today are written in English (Lillis & Curry, 2010), which confirms that English is the prevailing language of the international scientific community. In this context, the Vancouver conventions become useful for authors to write, read and find information

and support the text composing process by providing writers with comprehensive guidelines as to how to go about it.

Textual homogeneity across language variables also became evident in the phraseological analysis of the corpus texts. Aligning with previous studies on academic phraseology (e.g. Biber; 2004; Biber et al., 1999), the writers from the three linguacultural backgrounds represented in the corpus (ENG, SPENG and ELF) all resorted to recurring phraseological units typical of the academic written register. Cortes (2004) observed that in History and Biology texts, the use of core (highly recurring) bundles was related to a more proficient level of the English. Given this, it can be assumed that both the SPENG and ELF writers show mastery of the recurring phraseology language. This confirms previous findings (see e.g. Granger, 1998; Meunier & Granger, 2008; Pérez-Llantada, 2014), supporting the view that the existing inventory of core bundles indicates that, possibly as a result of extensive reading of similar texts, writers memorize and routinize these prototypical language sequences.

In this PhD thesis similarities were also found in the use of phraseology by the SPENG and ELF writers' *vis-à-vis* ENL writers, a finding which supports previous claims on the existence of "academic Englishes" (Mauranen et al., 2010). On a related manner, another main finding of this PhD work was the identification of distinctive phraseological units in the SPENG and ELF texts, indicating the use of bundles that did not appear in the ENL texts with the same frequency of use. This broader repertoire of bundles thus suggests that L2 academic phraseology may be the result of L1 phraseology transfer when writing in English as an L2, yet this is an aspect that would require further enquiry in future research.

Biber and Barbieri (2007, p. 265) claim that the different sets of sequences used by writers, no matter their language and disciplinary field they belong to, are related to communicative purposes (indicating referential meanings, indicating readers the textual

organization of the discourse and, in case of stance bundles, expressing an opinion or an evaluation of proposal content). Hyland (2005) observed that the different discourse strategies reflect different authorial positioning. Across languages and disciplines, the recurring use of these word combinations is related to various communicative purposes: referential, discourse and stance purposes. Divergences between the ENG texts and the SPENG and the ELF texts seemed to lie in the pragmatics of the texts.

As explained in Chapter 3, recurring epistemic bundles (*appears to be, suggests that the*) in the ENG texts contain semi-modal verbs that hedge authorial claims in Discussion Section of the RAs. Those bundles were not so frequently used in the SPENG and ELF texts. Supporting Kerans' (2002) claim that "differences in discourse modulation are attributed to the fact of writing in English as a second language" (p. 41), the findings of the present study support the view that L2 English discourse does not fully adhere to the Anglophone conventions as regards the expression of authorial stance modality. In this sense, it can be concluded that the phraseological analysis lends credence of the concept of 'alternative academic written Englishes' (Mauranen et al., 2010), as stated earlier, a term coined to refer to variants of academic discourse that differ from the Anglophone academic discourse conventions.

The fact that the recurring phraseology of the texts written by researchers from non-Anglophone backgrounds differs from that of the ENG texts in the expression of interpersonal meanings aligns with previous contrastive rhetoric studies' claims on the existence of culture-specific academic writing styles (Duszak, 1994; Kourilová, 1998; Mauranen et al., 2010; Pérez-Llantada, 2012, 2013, see also InterLAE research).

From the perspective of Second Language Acquisition theory, one might conclude that the hybridity entailed in L2 phraseology accounts for cross-linguistic influence, as also reported earlier (Ädel & Erman, 2012; Granger, 1998; Meunier & Granger, 2008; Cortés, 2008, inter alia). According to SLA theorists, mastery of bundle usage is

directly related to fluency in L2 production (Ellis, 1997). Frequency of use thus suggests mastery of those bundles. However, the structural and functional characterization of recurring bundles showed that the bundles used in the SPENG texts perform different functional purposes at a discourse level and thus reflects interlanguage stages in the L2 that are not yet fully native-like. As seen in Chapter 4, this can be interpreted as a transfer of linguistic features from the L1 to the L2 (English). As Pérez-Llantada (2014) explains, researchers tend to memorize these structures to help them with the RAs writing. In the case of the SPENG writers, these set phrases are picked up through reading similar texts.

In sum, the top-down/bottom-up approach thus proved useful as a methodology that makes use of corpus data to test intuitions and verify hypotheses.

6.1.2 Findings of the ethnomethodological analysis

The main aim of Chapter 4 was to investigate the uses and functions of English for international research publication purposes from the insiders' perspectives, i.e. through the reported experiences and attitudes towards the use of ERPP in a small, localized, biomedical research community based in Spain. The aim was to examine their perceptions, practices and attitudes towards English as an international language. In order to further the conclusions of previous studies with other cohorts of non-Anglophone researchers that also use English for knowledge dissemination and publication purposes (Curry & Lillis, 2004, 2010; Ferguson et al., 2011; Fernández-Polo & Cal-Valera, 2009; Lillis & Curry, 2006; Pérez-Llantada et al., 2010; Pérez-Llantada, 2012; Muresan & Pérez-Llantada, 2014; Uzuner, 2008, *inter alia*), the initial broad research question posed was: *How are the roles and functions of English for Research*

Publication Purposes perceived by researchers from a Spanish linguacultural background? What challenges does ERPP pose to these researchers, as EAL users, in the biomedical research field?

A major finding of the interviews was the interviewees' unanimous view of English as the main scientific language today. The predominant role of English was seen as an advantage to native-English speakers, insofar as it was thought to ease publication for English native speakers although, for those who are not native, such as native Spanish researchers, proved to be a language barrier in the production of texts. English was also portrayed as a major research language, playing the role of communicating new scientific knowledge to the world's scientific community. The fact that English embraces three different linguacultural communities (ENG, ELF, and SPENG) suggests that EIL holds the status of lingua franca.

Among the reasons why English stood as the preferred language for knowledge dissemination internationally, like other communities of non-Anglophone researchers, the interviewees stressed the value of reaching high-impact journals, highly valued by the international biomedical community. Other reasons noted were visibility, recognition and promotion, along with personal satisfaction (see also Curry & Lillis, 2004; Flowerdew, 1999; Ives & Obenchain, 2007). Findings thus confirm that there seem to be similar attitudes and views of English across communities of researchers worldwide.

Interview data also provided relevant insights into the researchers' writing for publication practices. Among others, reading English articles and copying and pasting language chunks, using recurring lexical bundles to scaffold the text-composing process were recurring strategies used by the interviewees. In many ways, these strategies proved not to be associated with a feeling of disadvantage for being non-native speakers of English. Rather, the researchers drew on these strategies to cope with limitations in language competence and academic literacy skills. Even if there

were perceived language burdens, most of the researchers preferred to write directly in English and drew on colleagues with higher English language competence or linguistically competent enough to draft texts in English or translate them into English.

English was also perceived as a requisite for full participation in the scientific arena, and this perception in turn raised greater awareness of the language barriers pending to be solved, not only in academic writing but also in academic spoken communication. Consistent with previous studies (e.g. Muresan & Bardi, 2015; Gnuztmann et al., 2015), the challenges of writing in the L2 were also solved through the use of the Internet, online translation software and online dictionaries. Use of textual models (e.g. previous published papers) to first identify and later use similar writing conventions also proved to be a recurring strategy for text composing. Occasionally, language brokers (colleagues, reviewers and editors) supported in different ways the text-composing process.

Englander (2013) underlines that publishing in English prestigious journals serves not only to disseminate new scientific knowledge but also to reach a higher level of national and/or institutional prestige. The researchers readily acknowledged that publishing in English may open a door to international collaboration that would allow them to share their research and exchange knowledge with other researchers. This was the main reason while, in spite of the reported language difficulties, English did not seem to represent an insurmountable barrier when communicating new knowledge with the biomedical community. Notwithstanding this, several criticisms were raised towards the kind of comments journal referees made to the researchers' manuscripts regarding the quality of the language, which eventually turned to the manuscript's rejection for publication.

Salient among the present findings was the fact that the researchers unanimously reported a particular sense of disadvantage, but only in relation to spoken

communication in international English-medium conferences, more so than for academic writing (consistent with InterLAE research findings, Ferguson et al., 2011, Pérez-Llantada, 2012). Participating in English-medium academic events was unanimously described in comments such as an “additional effort” or “a feeling of resignation”. These findings call for the need to formulate realistic and appropriate interventions to support this community of researchers. Considering that Van Parijs’ (2007) measures to redress the feeling of linguistic disadvantage (‘unfair linguistic play’) do not seem feasible or easy to implement, some pedagogical proposals and suggestions are provided in one of the following subsections.

In sum, the insiders’ stories provided valuable insights into ERPP practices and into attitudes and perceptions towards writing academic texts in an additional language. More importantly, considering their stories, one may conclude that while choice of Spanish for publication purposes involved communicating science at a (mainly) local level, choice of English involved global scientific communication exchange. Hence there existed multilingual practices catering for different communicative purposes in this cohort of researchers.

6.1.3 Findings of the ethnographic analysis

The ethnographic approach sought to address the questions of language, locality and practice as a way of moving forward in our understanding of how language operates as an integrated social and spatial activity within research communities of practice.

The third broad research question was *What is the role of academic English vis-à-vis other academic languages in the workspace of the community of biomedical*

researchers investigated? What are its functions in this particular site of social engagement? (RQ3)

Although the qualitative study conducted in Chapter 5 was descriptive and exploratory, researching social processes and community practices through the study language and communication ethnographically enabled an understanding of social practice in the particular setting investigated. In this PhD, this third analytical approach proved useful to explore the workplace where the cohort of researchers conducted their professional activities. The observational analysis in turn generated questions for further analysis. In addition, it helped to construct claims about factors contributing to the observed recurring practices in the researchers' workspace and paved the way to constructing grounded accounts and develop explanations of observed spaces, types of texts (genres) and languages. As stated in the Methods chapter, observations were conducted in the spaces where the researchers participated in events of everyday life within their disciplinary group. Overall, workplace observation through ethnographic methods proved insightful to know about the researchers' daily routines involving access, exchange and dissemination of scientific knowledge. The observation protocol further yielded insights into the recurring spaces, materials and texts through which scientific knowledge is generated, accessed, exchanged and disseminated.

From the observation, it was clear that the researchers' daily activities were based strictly on assistance work. They devoted their working time to assisting patients and conducting laboratory work, which confirmed the researchers' observation that research writing was done after work hours. The ethnographic observation also lent credence of the existing digitization of all the workspaces and all the work done was computer-mediated.

As the researchers themselves reported in the semi-structured interviews, observation of the workspaces and materials confirmed that during working hours no time was

devoted to researching and writing for research publication purposes. Journal articles placed on some of the researchers' desks were merely texts for medical consultation. Not working papers involving research in progress for eventual publication in a journal were found. Observation of spaces further served to identify the repertoire of genres (mainly journals/journal articles and monographs) and the roles played by academic languages. Publications in French and German recalled the role of these research languages in the past decade and publications in Spanish indicated that the researchers draw on these books to consult aspects of medical (professional) practice. Clearly, the observation showed that English prevails as the current scientific language and as the main means for accessing and disseminating scientific knowledge.

Finally, observation of spaces also suggested that work was done in a collaborative way, supporting previous studies on EAP and disciplinary discourses. As stated earlier, Hyland (2016) underlines the importance of "participation" in disciplinary practices and refers to this concept as pertinent to understand a scholar's involvement in his/her community practices and in the everyday patterns of activity. The observation of the cohort of MPs proved useful to understand the communication dynamics of a small, localized community of practice, their patterns of activity and the roles and functions that Spanish and English performed and represented in their workspaces in the context of scientific knowledge generation, knowledge access, knowledge exchange, knowledge dissemination and publication.

Although it was not identified in the in situ observation, one might hypothesize that participation and collaborative work also prevailed in the research-oriented practices of the cohort investigated. In fact, the interview data was confirmatory that the recurring practice among the cohort of Spanish researchers was writing articles collaboratively.

6.2 Triangulation of findings

In the three previous chapters I discussed i) text-composing practices, with a focus on research article writing in EIL, ii) the researchers' attitudes and perceptions of the role that English performs in the processes of scientific knowledge production and dissemination (i.e. how knowledge becomes text and text begets knowledge) and, finally, iii) the context of communication practices, that is, the spaces, materials and text types through which knowledge is accessed, exchanged and disseminated. What follows is a discussion on the intersecting paths of the three datasets.

Anthony Giddens' (1990) definition of 'globalization' as the "intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa" (p. 64) invites reflection on those aspects of social activities that have been impacted by globalization. From the data gathered from the three datasources it seems clear, at least at the small-scale investigated, that the local microcosm of the community of researchers investigated, is part of a 'knowledge-intensive economy' driven by and relying on global modes of connection. In this latter context, there is evidence that English prevails as the shared lingua franca (Crystal, 2003; Gnutzmann et al., 2015; Plo & Pérez-Llantada, 2015). It facilitates knowledge exchange, dissemination and publication worldwide through the main research-oriented genre, namely, the scientific article. As Chang (2006) succinctly puts it, globalization is "a driving force to strengthen the position of English as a global language" (p. 515). The triangulation of the findings obtained from the three analytical perspectives (textual, ethnomethodological and ethnographic) rendered the following view of ERPP in the context of biomedical research communication.

Firstly, English stands as the international language of biomedical research, the language that supports knowledge exchange and dissemination. The use of

standardized conventions, both at rhetorical and phraseological levels in English-medium publications has proved to facilitate and support knowledge exchange and dissemination within the international community (Figure 6.1).

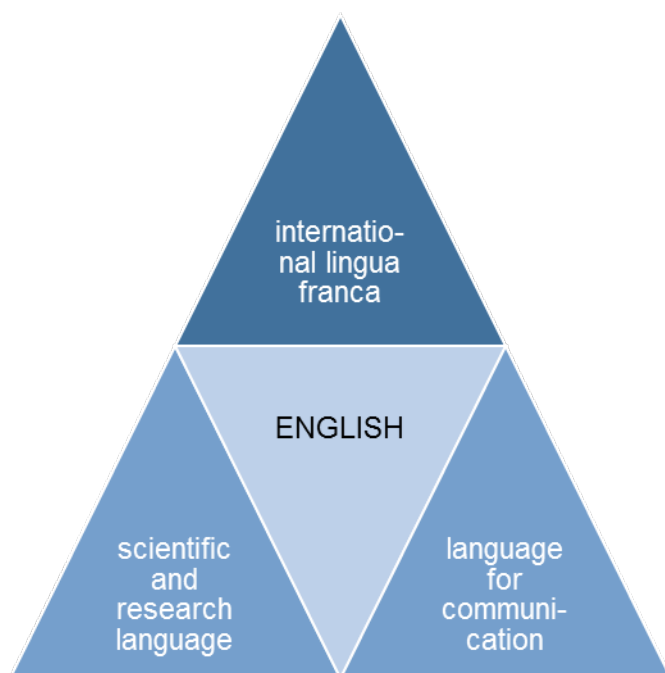


Figure 6.1

Status and functions of English in research settings.

This view supports House's (2003) claim that English does not represent a threat to multilingualism because it acts as a 'language for communication' and not as a 'language for identification'.

Yet, the prevailing role of English brings into surface the so called 'unfair linguistic play' (Van Parijs, 2007) and the reported linguistic disadvantages felt by non-Anglophone researchers such as those forming the cohort of Spanish researchers investigated in

this PhD. Researchers from linguacultural backgrounds other than English face the dilemma of publishing in English or perishing in a highly competitive research world. Such feeling of disadvantage appears to be associated with low language competence and academic literacy skills in English and insufficient and, perhaps, not fully effective foreign language educational backgrounds.

According to the findings described earlier in this PhD, ways of coping with the linguistic disadvantage posed by the prevailing status of English exist. Strategies range from drawing on professional translators, improving drafts with the help of journal reviewers and journal editors' comments, using the Internet and online resources and seeking help from colleagues with higher language competence and advanced academic writing skills.

The status of English as an international research language and, more precisely, a shared language for communication also brings to the fore several advantages to those non-Anglophone researchers in the semi-periphery that write in ERPP. The use of English facilitates publication in high impact factor journals as well as global dissemination of the new scientific knowledge. This, in turn, brings about other advantages to the researchers, such as promotion, recognition and international prestige. Further, as the literature also reports, the findings of this PhD thesis suggest that not only researchers but also scientific journals shift to English to reach a wider audience, international visibility and recognition.

The present findings also suggest that the nature of this ERPP is complex and, formally speaking, hybrid, as the L2 academic texts exhibit rhetorical and phraseological similarities with L1 academic texts. Contesting what she conceptualizes as the 'epistemicide' of culture-specific rhetorical traditions, Bennett (2007, 2014) raises concern towards the possible effects the global spread of English as the dominant lingua franca for academic communication and the adverse effects of such dominance

on culture-specific academic styles and rhetorical traditions other than the Anglophone tradition. This author criticizes the loss of Portuguese academic discourse features in articles written in Portuguese by Portuguese researchers and translated into English. The fact that the L2 texts contain similarities with L1 academic texts at the level of macro-rhetorical organization and phraseology (i.e. common structures and core bundles) might be indicative as well of the epistemicide of the Spanish academic rhetoric. However, the comparison of texts written in English by researchers from both Anglophone and non-Anglophone Spanish-based contexts lends credence of the existence of hybrid discourses, that is, linguistic features at a phraseological level that the authors might be possibly transferring from their L1.

Discoursal hybridity instantiates how writers adhere to the default Anglophone-dominant conventions for publishing in English-medium international journals and, at the same time retain some culture-specific linguistic traits and rhetorical styles of their academic L1s. The cross-linguistic analysis of the texts (ENG vs. SPENG and ELF) evinces the presence of 'academic Englishes' (Mauranen et al., 2010) in research article writing, which would contest the 'epistemiciding' effects of English as dominant lingua franca for research publication over other academic languages and rhetorical traditions. Implications for professional translating and language editing will be discussed later in this chapter. It is important to stress, though, that the discoursal hybridity of the SPENG and ELF texts neither impedes eventual publication nor hampers communication. Rather, it instantiates the use of English as a shared lingua franca and a language for communication within the international scientific and research community.

Secondly, several SLA-related issues emerge from the findings regarding the use of English as a global language for scientific communication, namely, issues related to formal instructed learning, incidental learning processes and situated learning (Figure 6.2).

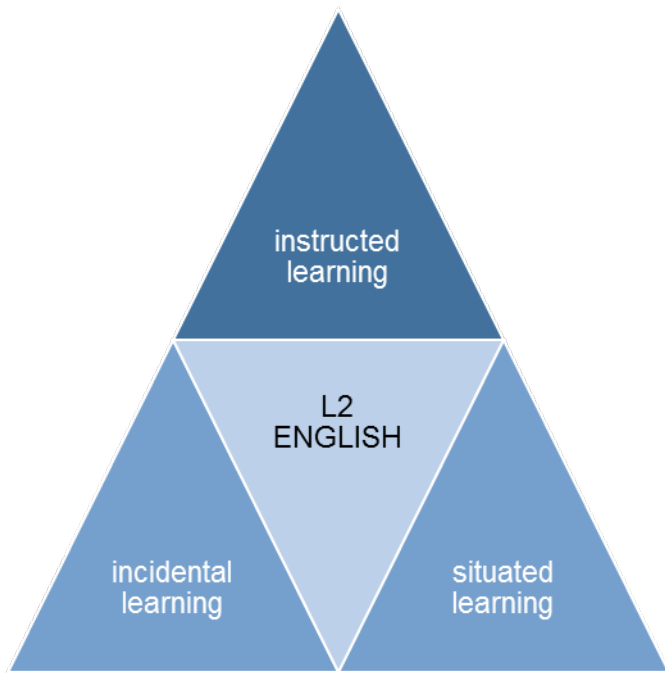


Figure 6.2

Aspects of L2 English learning processes.

The data gathered from the three analytical approaches proved to shed light into a number of issues. Firstly, it exemplifies the importance of receiving effective second language learning education. Linguistic challenges/difficulties and reliance on language brokers (translators and journal editors/reviewers) and other strategies to cope with such difficulties have been reported in communities of L2 English researchers worldwide. Behind those challenges and difficulties and poor English/academic English language competence and behind perceived unfair linguistic play there seem to lie either absence of formal instructed learning or unsuccessful L2 English language learning experiences and /or absence or unsuccessful academic literacy instructed learning, as the cohort of researchers interviewed for the present PhD readily acknowledged.

Formal instructed learning both in General English and in academic English might have redressed the reported challenges that L2 academic English writers faced when writing research genres or parts of genres that involve complex argumentation skills (e.g. discussion sections of journal articles). Hirvela and Belcher (2001) stress the challenges posed by English regarding aspects of voice and identity in texts written by non-Anglophone writers and the need to “understand the voice-related issues these mature writers encounter in L2 contexts” (p. 83).

Secondly, the role of incidental learning has generally tended to be disregarded by the EAP literature (Pérez-Llantada & Swales, 2017). Yet, the findings of this PhD provide preliminary evidence that there might exist processes through which L2 academic English is learned incidentally. The findings from Chapter 3 showed that texts adhered to the established rhetorical conventions for information organization and that they exhibited the use of recurring lexico-grammatical units to convey referential, discourse and stance meanings. In Chapter 4 the researchers reported the use of models and templates to scaffold the text-composing process, mainly, that of journal articles. Also, the interviewees noted they learnt through extensive drafting of research articles and reported that, over time, they eventually mastered academic writing in English as an L2. Observations of workspaces, reported in Chapter 5, also point to possible incidental learning processes through exposure to the repertoire of genres (abstracts, research articles, monographs, books, conference proceedings, educational booklets, among others). It might be hypothesized that through exposure to those texts, the researchers may be picking up the established academic writing conventions (particularly, those related to macro-organization information patterns and phraseology).

Thirdly, the issue of situated learning emerges as an aspect that sheds further light into our understanding of biomedical writing processes. In the biomedical community investigated, the researchers did not engage in the writing process individually. Instead, collaborative writing was a distinctive trait of this community, which was not

the case of other disciplinary tribes described in the literature such as those in the fields of humanities (e.g. Becher, 1981, 2001; Swales, 1998; Tusting & Barton, 2016).

One might further assume that it is through such collaboration that senior-junior processes of enculturation may be taking place. The interview data further supported the existence of such processes and the crucial role of the senior researchers (e.g. PhD supervisors) in instructing the junior researchers on academic writing conventions. Also, although further in-depth exploration would be necessary, observation of spaces tentatively suggested that collaboration at the workplace and workplace activities involving sharing and exchanging scientific knowledge within each community of professional practice may be a recurring dynamics in situated learning processes.

On a final note, ERPP practices appeared to be mediated by technology. As also reported in other cohorts of academics (see, e.g. Tusting & Barton, 2015), it is likely that technology might be playing a role in the way in which professional practice is conducted and in the way new scientific knowledge is produced, exchanged and disseminated. Computers occupied central spaces in the researchers' workstations. One can assume that the Internet makes it possible to access scientific knowledge in an electronic format (e.g. shared use of databases). However, given that printed journals and journal articles occupied central spaces at the workplace, it is also likely that scientific knowledge access and dissemination within the particular community investigated is conducted through genres in both printed and electronic formats.

With the data gathered from the three analytical perspectives, it seems possible to conclude that English plays a key role as the main language of the scientific community worldwide and as the language facilitating access to and dissemination of new scientific knowledge on an international scale. As for its status, according to the findings English is perceived more as an opportunity rather than as a threat. Though attitudes towards the prevailing role of English proved somehow mixed, and certain

feeling of linguistic disadvantage was felt, English was clearly perceived as an instrumental language, the language for scientific and research communication.

Given the above claims, the findings provide evidence that the traditional dichotomy between native and non-native English speakers is no longer valid at a time in which the non-native speakers of English far outnumber the native-English speakers in the context of writing for ERPP. Further, findings show that both standard and non-standard features of texts recurred in L2 English writing and were acceptable for publication.

Finally, while English had a high communicative value for global, international communication, the national language also played a key role within the local communication dynamics, enabling the exchange of scientific information and the development of professional practices. Along with English, other academic languages such as French and German, coexisted in the workplace, helping us recall that in the past decades they were both scientific languages. Intersecting languages, research genres perform different roles and different functions, by this means mediating social interaction practices in particular sites of social engagement.

6.3. Implications

6.3.1 Implications for formal instructed learning

If we turn to the implications for formal instructed learning, the findings of this PhD reflect the importance of conducting a needs analysis to better identify the researchers' language lacks and target needs. Data has shown that the scholars need rich

instructional input on the rhetorical and phraseological conventions established by their scientific community. In addition, they would need to develop awareness of aspects of modality and authorial stance in L2 writing and of the existence of different academic writing traditions across languages and cultures. Also, given their reported weakness in oral proficiency, it would be appropriate to provide them with instructional support so that they can learn how to communicate successfully (e.g. prepare a speech to present research findings in front of an international audience successfully, attend international conferences and effectively respond to questions from the audience).

To cater to their needs, it seems sensible to propose a Swalesian genre-based approach (Swales, 1990; Swales & Feak, 2009), so that the researchers can analyse models, become aware of their textual features (both at a rhetorical, discourse and phraseological level) and practice, through tasks, those features so that acquisition takes place (see Feak & Swales, 2010, 2011; Swales; 1990; Swales & Feak, 2009) (Figure 6.3).

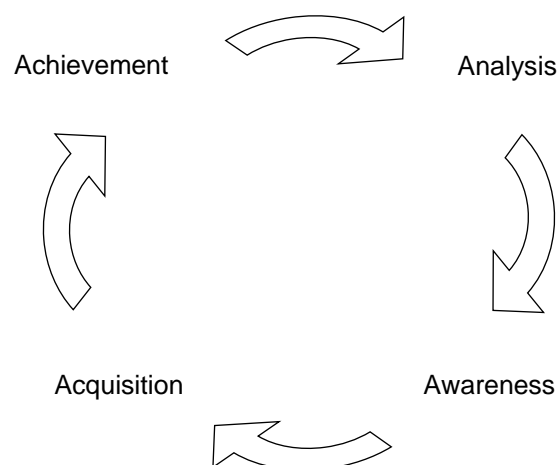


Figure 6.3

Cycle of rhetorical consciousness raising (Swales & Feak, 2009).

This approach to academic English pedagogy would raise awareness of standard/multilingual lexico-grammar and would facilitate exposure to genre models, contrastive L1/L2 texts, and discussion of rhetorical strategies for composing texts, discussion based on the use of metalanguage (e.g. the expression of modality, authorial stance, textual and interpersonal metadiscourse, etc.).

To best suit their needs and provide them with relevant learning tasks, corpus-informed and corpus-based materials can be designed, e.g. following the guidelines provided by Feak and Swales (2010). Feak (2009) also stresses the importance of data-driven learning based on corpora in EAP and ESP materials development. Teaching materials with tasks eliciting analysis and practice of rhetorical and phraseological features of the texts would be relevant. In addition, use of teaching materials based on examples taken from multilingual corpora such as, e.g. the corpus used for this PhD study, could provide the researchers with exposure to real texts and real academic language use.

It would also be important to provide instruction focused on those genres that are particularly relevant according to learners' target needs. In the cohort investigated, for instance, out of the repertoire of texts identified in the context of scientific knowledge production, genres such as the journal article, the abstract and, to a lesser extent, the monograph should be instructed formally. As Gentil (2011) postulates, genre knowledge in an L1 is potentially transferable in the L2. Making the researchers aware that they can transfer their knowledge of those genres to compose genres in an L2 would be very appropriate too.

L Flowerdew (2000) argues that EIL and, in particular ERRP, "blurs the boundaries of the three circles" and thus pedagogical adjustment is needed in EAP instruction. Providing instruction with opportunities to identify similects that originate in cross-linguistic influence (as was the case of the bundles used in the SPENG and ELF texts, not shared with the ENG texts) would raise awareness of processes of L1 to L2

transfer and critical reflection on whether or not it is convenient to adhere to the normative use of standard English language conventions. Furthermore, exposure could provide an opportunity to let them know that published texts such as the journal articles analysed in Chapter 3, containing both standard and non-standard features, have been accepted for publication.

Wingate's (2012) approach to using genre-based models for academic writing instruction seems an appropriate approach to support the research writing and literacy practices of the community investigated (see also Tribble & Wingate, 2013).

6.3.2 Implications for language brokers

The data collected in this PhD is expected to inform to professionals working in the fields of biomedical translation and language revision/language editing, as recommended by Kerans (2002) and Cooke and Birch-Becaas (2008). These language brokers may support researchers when publishing in English in various different ways, as explained below.

In the light of the findings discussed above, it would be convenient that translators and language revisers and editors alike become acquainted with the reported strategies that the researchers use to compose texts (e.g. writing in Spanish and then translating them into English or, alternatively, copying and pasting language chunks from previous texts to scaffold the text composing process).

Schäffner (2002) commented that the idea that understanding the text is a prerequisite to translating it (p. 2). Hence, having a background in academic literacy conventions would be useful to best approach the translation process. In the case of texts already

translated into English by the researchers, it would be important to pay attention to the differences in the grammar systems of the source language and the target language, as well as differences in the modality systems of the two languages. In this respect, a translator would need to pay attention to the appropriateness of the discourse functions that recurring phraseological units perform at a textual level, particularly in those sections of the journal article in which argumentation is crucial (for example, in the discussion sections).

Language revisers would need to ensure that the texts comply with the Vancouver conventions established by the ICAME. As stated previously, adherence to those conventions guarantees readability as regards successful transmission of information. It would also be important for a language reviser and/or a language editor to assess the extent to which distinctive features of 'academic Englishes' texts, for example, culture-specific traits in the construction of arguments and in the expression of authorial stance, affect the pragmatics of the text and/or the readability of the texts. In other words, it would be essential to assess whether those features hamper communication or whether they may lead to eventual rejection of the manuscript by the journal editor/referees. As discussed previously in an earlier chapter, the researchers reported that they often received numerous comments from journal editors and journal reviewers regarding poor language use, pragmatic infelicities, etc.

Another important aspect to be taken into account in the translation/revising processes would relate to the 'epistemicide' of the writers' rhetorical style conventions in their L1 (e.g. the claims made by Karen Bennett's work in this respect). When comparing English Academic Discourse with other languages such as Portuguese, this author notes that while EAD prefers a more simple and straightforward expression of the language, traditional Portuguese is focused on complexity, ornamentation and a surface style which makes more difficult its understanding or translation. Bennett further explains that although there is an epistemological equivalence between

Portuguese and English in some genres or fields, in many others, both are ruled by very different norms. Indeed, these epistemological disjunctions need to be addressed and handled successfully in the translation and language revision/editing processes.

Finally, given that biomedical writing is highly standardized, knowledge of the defining features of the repertoire of genres, as well as knowledge of the intended audience and communicative purposes of each genre used by a particular community of practice are crucial to support and guide the translator's or the language reviser's decisions in their respective tasks.

6.3.3. Implications for self-directed, autonomous learning

A final note on self-directed, autonomous learning should be made here. From the findings, it seems clear that time constraints to learn English and lack of appropriate EAP instruction targeted at the cohort investigated makes it important to approach lifelong learning.

In the Introduction of this PhD I referred to aspects of lifelong learning in the context of knowledge societies (cf. Figure 1.1 this thesis, Weert, 2005, p. 19). The results of the previous chapters appear to confirm that learning to write research genres is an ongoing process: people learn by doing (i.e. researchers become experience writers through extensive writing), people learn in groups and from each other (i.e. the researchers reported they learnt from colleagues with higher language competence and, on the other hand, the juniors learnt from the experienced writers. In sum, data pointed at aspects of 'situated learning' within the community (cf. Lave & Wenger, 1991; Dressen-Hammouda, 2008). Two further aspects are deemed necessary, as the EAP has already pointed out (Muresan, 2015; Pérez-Llantada & Swales, 2017;

Schluer, 2014), researchers need training in academic writing as part of their professional development plan (e.g. in-house learning, private lessons, etc.) and, assuming that people have access to learning opportunities over a lifetime, researchers can also profit from being train in self-directed learning and in the use of tools and resources (grammar textbooks, corpora, concordance software, internet, online dictionaries, translation software, etc.) to support the writing process.

As seen in Chapter 1, lifelong learning has gained momentum on educational grounds (Weert, 2005). The original statement in which the teacher was the source of knowledge has been replaced by the idea that a teacher can also be a guide for students to obtain the knowledge. In this type of learning, students learn by doing, and not just by receiving the theory directly from the teacher and learning it by heart.

This PhD study thus seeks to contribute to assessing educational proposals for learning English for biomedical research publication purposes on a lifelong learning basis. The development of the present empirical research can also be used as a reference data for language planning, curriculum design and development of teaching resources for the biomedical community. Some guidelines based on current quality standards in teaching/learning foreign languages and scientific language for research purposes can also be proposed in the light of the present findings. The multiperspective nature of the data compiled for the present research purposes can also serve as a framework for those professionals working in the areas of biomedical translation, proofreading and linguistic mediation services, as also proposed by Cooke and Birch-Becaas (2008).

6.4. Areas for future research

In future research, a comprehensive analysis of each of the sub-disciplinary domains investigated would need to be carried out so as to gain deeper insights into the kind of texts written and used in their everyday professional and research practices. It would be of particular interest to further assess their reading and writing practices so as to understand how they acquire both language competence and academic literacy skills. This could be done through additional ethnographic methods similar to that used in this PhD, for example, participant observation, writing behaviour explorations and/or longitudinal case studies of individual subjects.

Another important area to investigate further in the future is that involving an in-depth comparative analysis across the broad disciplinary domains (i.e. with the Social Sciences, the Humanities and the Physical Sciences and Engineering), also represented in the SERAC corpus. Explorations of texts along with explorations of use of genres and languages in context would very likely give further insights into the complexity of L2 English research writing.

Graddol (2006) listed three major international domains relevant for the scope of this dissertation: working language of international organizations and conferences; scientific publications and Internet communication. The present findings on the role of research languages for communicating science at local/global level and the researchers' decisions regarding 'staying local' versus 'going global' need further investigation in future research. It is very likely that researchers in the biomedical field will need to keep on making decisions on language choice and decide when, where and why using Spanish and English as scientific languages.

The interview data also enabled us to identify several areas in which further research could be of benefit. These would include the researchers' spoken academic literacies; the role of 'language brokers' for supporting the researchers' language problems when writing texts in ERPP; the role played by the senior researchers in enculturating the juniors and in enhancing their genre knowledge; the use of translation as a L2 writing strategy and the use of other strategies that may assist the researchers in their writing process, with a particular focus on digital and Internet-based tools; and, finally, the design of needs analyses that could inform EAP instructional programmes and lifelong learning processes.



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8.1. APPENDIX I: LIST OF CORPUS TEXTS

8.1.1 Haematology Texts

-BIO ELF HAE 1 Kyotani, M, Okumura, K., Takagi, A, Murate, T; Yamamoto,K, Matsushita, T, Sugimura, M, Kanayama, N, Kobayashi, T, Saito, H, Kojima, T. (2007). Molecular basis of antithrombin deficiency in four Japanese patients with antithrombin gene abnormalities including two novel mutations. *American Journal of Haematology*, 702-705.

-BIO ELF HAE 2 Mistry PK, Sadan S, Yang R, Yee J, Yang M. (2007). Consequences of diagnostic delays in type 1 Gaucher disease: The need for greater awareness among Hematologists–Oncologists and an opportunity for early diagnosis and intervention. *American Journal of Haematology*, 697-701.

-BIO ELF HAE 3 Gando, S, Sawamura, A, Hayakawa, M, Hoshino, H, Kubota, N. and Oshiro, A. (2006). First Day Dynamic Changes in Antithrombin III Activity After Supplementation Have a Predictive Value in Critically Ill Patients. *American Journal of Haematology*, 907-914.

-BIO ELF HAE 4 Morotti A1, Cilloni D, Pautasso M, Messa F, Arruga F, Defilippi I, Carturan S, Catalano R, Rosso V, Chiarenza A, Taulli R, Bracco E, Rege-Cambrin G, Gottardi E, Saglio G (2006).NF- κ B Inhibition as a Strategy to Enhance Etoposide-Induced Apoptosis in K562 Cell Line. *American Journal of Haematology*, 938-945.

-BIO ELF HAE 5 Cacciapuoti C1, Terrazzano G, Barone L, Sica M, Becchimanzi C, Rotoli B, Ruggiero G, Alfinito F (2007) Glycosyl-Phosphatidyl-Inositol-Defective Granulocytes From Paroxysmal Nocturnal Haemoglobinuria Patients Show Increased Bacterial Ingestion But Reduced Respiratory Burst Induction. *American Journal of Haematology*, 98-107.

-BIO ELF HAE 6 Cheung WW1, Tse E, Leung AY, Yuen KY, Kwong YL.(2007) Regular Virologic Surveillance Showed Very Frequent Cytomegalovirus Reactivation in Patients Treated With Alemtuzumab. *American Journal of Haematology*, 108-111.

-BIO ELF HAE 7 Castagna L1, Magagnoli M, Balzarotti M, Sarina B, Siracusano L, Nozza A, Todisco E, Bramanti S, Mazza R, Russo F, Timofeeva I, Santoro A. (2006). Tandem High-Dose Chemotherapy and Autologous Stem Cell Transplantation in Refractory/Relapsed Hodgkin's Lymphoma: A Monocenter Prospective Study. *American Journal of Haematology*, 122-127.

-BIO ELF HAE 8 Novack V1, Finestone AS, Constantini N, Shpilberg O, Weitzman S, Merkel D.(2007). The Prevalence of Low Hemoglobin Values among New Infantry Recruits and NonLinear Relationship between Hemoglobin Concentration and Physical Fitness. *American Journal of Haematology*, 128-133.

-BIO ELF HAE 9 Dizdar O1, Barista I, Kalyoncu U, Karadag O, Hascelik G, Cila A, Pinar A, Celik I, Kars A, Tekuzman G. (2007). Biochemical Markers of Bone Turnover in Diagnosis of Myeloma Bone Disease. *American Journal of Haematology*, 185-191.

-BIO ELF HAE 10 Shalev H1, Kapelushnik J, Moser A, Knobler H, Tamary H.(2007)Hypocholesterolemia in Chronic Anemias with Increased Erythropoietic Activity. *American Journal of Haematology*, 199-202.

-BIO ELF HAE 11 Bai X1, Huang M, Wu J, Huang X, Yan L, Lu Y, Wang S, Xu G, Zhou J, Ma D. (2008). Development and characterization of a novel method to analyze

global gene expression profiles in endothelial cells derived from primary tissues. *American Journal of Haematology*, 26-33.

-BIO ELF HAE 12 Kaptan K., Erinç K, Ifran A, Yildirim V, Uzun M, Beyan C, Işık E. (2008). Levosimendan has an inhibitory effect on platelet function. *American Journal of Haematology*, 46-49.

-BIO ELF HAE 13 Gursoy T1, Tekinalp G, Yurdakok M, Ozcebe O, Korkmaz A, Gurgey A. (2008). Thrombin activatable fibrinolysis inhibitor activity, thrombin-antithrombin complex and D-dimer levels in preterm neonates with early respiratory distress syndrome. *American Journal of Haematology*, 50-53.

-BIO ELF HAE 14 Ennishi D1, Terui Y, Yokoyama M, Mishima Y, Takahashi S, Takeuchi K, Okamoto H, Tanimoto M, Hatake K (2007). Monitoring serum hepatitis C virus (HCV) RNA in patients with HCV-infected CD20-positive B-cell lymphoma undergoing rituximab combination chemotherapy. *American Journal of Haematology*, 59-62.

-BIO ELF HAE 15 Boroujeni MB1, Salehnia M, Valojerdi MR, Mowla SJ, Forouzandeh M, Hajizadeh E. (2008). Comparison of gene expression profiles in erythroid-like cells derived from mouse embryonic stem cells differentiated in simple and co-culture systems. *American Journal of Haematology*, 109-115.

-BIO ELF HAE 16 Arpacı F., Tezcan I, Kuzhan O, Yalman N, Uçkan D, Kürekçi AE, İkinçioğulları A, Özet A, Tanyeli A. (2007) G-CSF-mobilized haploidentical peripheral blood stem cell transplantation in children with poor prognostic nonmalignant disorders. *American Journal of Haematology*, 133-136.

-BIO ELF HAE 17 Zhang WG, Wang FX, Chen YX, Cao XM, He AL, Liu J, Ma XR, Zhao WH, Liu SH, Wang JL. (2008). Combination chemotherapy with low-dose cytarabine, homoharringtonine, and granulocyte colony-stimulating factor priming in

patients with relapsed or refractory acute myeloid leukemia. *American Journal of Haematology*, 185-188.

-BIO ELF HAE 18 Xiao Z, Xue H, Li R, Zhang L, Yu M, Hao Y.(2008) The prognostic significance of leukemic cells clearance kinetics evaluation during the initial course of induction therapy with HAD (homoharringtonine, cytosine arabinoside, daunorubicin) in patients with de novo acute myeloid leukemia. *American Journal of Haematology*, 203-205.

-BIO ELF HAE 19 Nagasawa M, Yi Z, Imashuku S, Nonoyama S, Ogawa K, Okumura K, Mizutani S.(2008). Soluble TWEAK is markedly elevated in hemophagocytic lymphohistiocytosis. *American Journal of Haematology*, 222-225.

-BIO ELF HAE 20 Oshima K, Kanda Y, Nakasone H, Arai S, Nishimoto N, Sato H, Watanabe T, Hosoya N, Izutsu K, Asai T, Hangaishi A, Motokura T, Chiba S, Kurokawa M. (2008). Decreased incidence of acute graft-versus-host disease by continuous infusion of cyclosporine with a higher target blood level. *American Journal of Haematology*, 226-232.

-BIO ELF HAE 21 Alanio-Bréchet C, Schischmanoff PO, Fénéant-Thibault M, Cynober T, Tchernia G, Delaunay J, Garçon L. (2008). Association between myeloid malignancies and acquired deficit in protein 4.1R: A retrospective analysis of six patients. *American Journal of Haematology*, 75-78.

-BIO ELF HAE 22 Gra OA, Glotov AS, Nikitin EA, Glotov OS, Kuznetsova VE, Chudinov AV, Sudarikov AB, Nasedkina TV. (2008). Polymorphisms in xenobiotic-metabolizing genes and the risk of chronic lymphocytic leukemia and non-Hodgkin's lymphoma in adult Russian patients. *American Journal of Haematology*, 279-287.

-BIO ELF HAE 23 Goldaniga M, Ferrario A, Cortelazzo S, Guffanti A, Pavone E, Ambrosetti A, Marcheselli L, Rossi F, Luminari S, Rossi A, Cro L, Federico M,

Lambertenghi Deliliers G, Baldini L. (2008). A multicenter retrospective clinical study of CD5/CD10-negative chronic B cell leukemias. *American Journal of Haematology*, 349-354.

-BIO ELF HAE 24 Koren, A, Levin, C, Dgany, O, Kransnov, T, Elhasid, R, Zalman, L, Palmor, H, Tamary, H. (2008). Response to hydroxyurea therapy in β -thalassemia. *American Journal of Haematology*, 366-370.

-BIO ELF HAE 25 Kamata K, Manno S, Ozaki M, Takakuwa Y. (2008). Functional evidence for presence of lipid rafts in erythrocyte membranes: Gsa in rafts is essential for signal transduction. *American Journal of Haematology*, 371-375.

-BIO ELF HAE 26 Rostami N, Keshtkar-Jahromi M, Rahnavardi M, Keshtkar-Jahromi M, Esfahani FS. (2008). Effect of eradication of *Helicobacter pylori* on platelet recovery in patients with chronic idiopathic thrombocytopenic purpura: A controlled trial. *American Journal of Haematology*, 376-381.

-BIO ELF HAE 27 Chuhjo T, Yamazaki H, Omine M, Nakao S. (2008). Danazol therapy for aplastic anemia refractory to immunosuppressive therapy. *American Journal of Haematology*, 387-389.

-BIO ELF HAE 28 Khositseth S, Sirikanaerat A, Khoprasert S, Opastirakul S, Kingwatanakul P, Thongnoppakhun W, Yenchitsomanus, P.T. (2008). Hematological abnormalities in patients with distal renal tubular acidosis and hemoglobinopathies. *American Journal of Haematology*, 465-471.

-BIO ELF HAE 29 Asano-Mori Y, Kanda Y, Oshima K, Kako S, Shinohara A, Nakasone H, Sato H, Watanabe T, Hosoya N, Izutsu K, Asai T, Hangaishi A, Motokura T, Chiba S, Kurokawa M. (2008). Long-term ultra-low-dose acyclovir against varicella-zoster virus reactivation after allogeneic hematopoietic stem cell transplantation. *American Journal of Haematology*, 472-476.

-BIO ELF HAE 30 Yoshimi A, Izutsu K, Takahashi M, Kako S, Oshima K, Kanda Y, Motokura T, Chiba S, Momose T, Ohtomo K, Kurokawa M. (2008). Conventional allogeneic hematopoietic stem cell transplantation for lymphoma may overcome the poor prognosis associated with a positive FDG-PET scan before transplantation. *American Journal of Haematology*, 477-481.

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-BIO ENG HAE 5 Bennett CL, Evens AM, Andritsos LA, Balasubramanian L, Mai M, Fisher MJ, Kuzel TM, Angelotta C, McKoy JM, Vose JM, Bierman PJ, Kuter DJ, Trifilio SM, Devine SM, Tallman MS. (2006). Haematological malignancies developing in previously healthy individuals who received haematopoietic growth factors: report from

the Research on Adverse Drug Events and Reports (RADAR) project. *British Journal of Haematology*, 642–650.

-BIO ENG HAE 6 Hall AJ, Peake IR, Winship PR. (2006). Regulation of the human protein S gene promoter by liver enriched transcription factors. *British Journal of Haematology*, 538–546.

-BIO ENG HAE 7 Giammona LM, Fuhrken PG, Papoutsakis ET, Miller WM. (2006). Nicotinamide (vitamin B3) increases the polyploidisation and proplatelet formation of cultured primary human megakaryocytes. *British Journal of Haematology*, 554–566.

-BIO ENG HAE 8 Fung EB, Harmatz PR, Lee PD, Milet M, Bellevue R, Jeng MR, Kalinyak KA, Hudes M, Bhatia S, Vichinsky EP; Multi-Centre Study of Iron Overload Research Group (2006). Increased prevalence of iron-overload associated endocrinopathy in thalassaemia versus sickle-cell disease. *British Journal of Haematology*, 574–582.

-BIO ENG HAE 9 Raja KB, O Latunde-Dada G, Peters TJ, McKie AT, Simpson RJ. (2005). Role of interleukin-6 in hypoxic regulation of intestinal iron absorption. *British Journal of Haematology*, 656–662.

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-BIO ENG HAE 12 Kalfa TA, Pushkaran S, Mohandas N, Hartwig JH, Fowler VM, Johnson JF, Joiner CH, Williams DA, Zheng Y. (2006). Rac GTPases regulate the morphology and deformability of the erythrocyte cytoskeleton. *Blood*, 3637-45.

-BIO ENG HAE 13 Renshaw SA, Loynes CA, Trushell DM, Elworthy S, Ingham PW, Whyte MK. (2006). A transgenic zebrafish model of neutrophilic inflammation. *Blood*, 3976-8.

-BIO ENG HAE 14 Tsai AG, Cabrales P, Manjula BN, Acharya SA, Winslow RM, Intaglietta M. (2006). Dissociation of local nitric oxide concentration and vasoconstriction in the presence of cell-free hemoglobin oxygen carrier, *Blood*, 3603-10.

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8.2. APPENDIX II: ETHNOMETHODOLOGICAL PROTOCOL

8.2.1. Message sent to researchers before the interview

Research Knowledge Production and Dissemination – the Role of English as an International Language of Research

Dear colleagues,

You are kindly invited to fill in a questionnaire designed by an international team of experts*, within the framework of a PhD research project: “Research Knowledge Production and Dissemination – the Role of English as an International Language of Research”

Considering the interest in our academic environment for research and publication in English in international journals, the current study* aims to achieve a better understanding of researchers’ perceptions regarding the role of English for international communication.

Hoping that the outcomes of this study will be of interest also to you, we kindly ask you to take 10 minutes to fill in the questionnaire. I would be very grateful if you could do this by May, the 10th.

Arantxa Ventura Rubio

*Authors of the initial questionnaire: Muresan and Pérez-Llantada, 2014

8.2.2 Consent form

Research Knowledge Production and Dissemination – the Role of English as an International Language of Research

Consent Form

Please tick the following statements if you agree.

1. I have read and understood the information for the above project. *He leído y comprendo la información relativa a este proyecto.*
2. I understand that my participation is voluntary and that I am free to withdraw at any time. *Entiendo que mi participación es voluntaria y que soy libre de retirar mi participación en este estudio en cualquier momento.*
3. I understand that the information collected will be kept confidential and anonymous. *Soy conocedor de que la información que se recoja se tratará de forma anónima y confidencial.*
4. I agree to take part in this project. *Estoy de acuerdo en participar en este proyecto.*

Researcher's Name/ *Nombre del investigador*:

Researcher's Signature/ *Firma del investigador*:.....

Date/*Fecha*:.....

THANK YOU IN ADVANCE FOR YOUR COLLABORATION

8.2.3 Semi-structured interview protocol

1. Can you tell about the importance of publishing in English? It is important for you? Why? Tell me about your publications.
2. Do you publish in Spanish as well as in English? (What kind of things?)
3. Do you write papers in a team of researchers or individually? If yes, how is the responsibility for writing up divided up?
4. Can you tell me about your strategies for writing research in English? (e.g. do you write in Spanish first and then translate).What do you find most difficult about writing in English? (e.g. vocabulary choice, grammatical constructions, writing to persuade the reader, using hedging appropriately, etc....?)
5. Which part of the RA is for you generally the most difficult part to write (e.g. discussion, introduction, results, conceptual part or theoretical part)? Why?
6. Do you normally use language helpers to help revise the paper? Do you pay for the service? Can you tell me if you are satisfied with their service? In what ways, yes? In what ways, no? Do you think the hospital should contribute toward the cost of language helpers?
7. Do the journal editors/ reviewers of your papers make comments about your language or style? What kind of comments? Do you think the editors/reviewers are fair in their comments on your papers?
8. Are there any other language-related challenges do you face when using English for research purposes?
9. Is there anything else you would like to comment on this general topic?

