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# A corpus-based study of the phraseological behaviour of abstract nouns in medical English 

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# A CORPUS-BASED STUDY OF THE PHRASEOLOGICAL BEHAVIOUR OF ABSTRACT NOUNS IN MEDICAL ENGLISH -A NEEDS ANALYSIS OF A SPANISH MEDICAL COMMUNITY 

Tesi doctoral presentada per

## Natàlia Judith Laso Martín

com a requeriment per a l'obtenció del títol de

## Doctora per la Universitat de Barcelona

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Directores: Dra. Anna Poch Higueras (juliol 2005-juny 2008)
Dra. Isabel Verdaguer Clavera (juny 2008-octubre 2008)
Tribunal: Dr. Pernilla Danielsson
Dr. Suganthi John
Dr. Pedro Guardia Massó

A mi padre, por ser el patrón de cualquier viaje A mi madre, por enseñarme la vida secreta de las palabras A mi hermana, por ser la compañera de todas mis travesías

## In Memoriam

O Captain! my Captain! our fearful trip is done, The ship has weather'd every rack, the prize we sought is won,
The port is near, the bells I hear, the people all exulting, While follow eyes the steady keel, the vessel grim and daring:
But O heart! heart! heart! O the bleeding drops of red, Where on the deck my Captain lies, Fallen cold and dead.

O Captain! my Captain! rise up and hear the bells; Rise up -for you the flag is flung-for you the bugle trills, For you bouquets and ribbon'd wreaths -for you the shores a-crowding,
For you they call, the swaying mass, their eager faces turning;
Here Captain! dear father! This arm beneath your head! It is some dream that on the deck, You've fallen cold and dead.

My Captain does not answer, his lips are pale and still, My father does not feel my arm, he has no pulse nor will, The ship is anchor'd safe and sound, its voyage closed and done, From fearful trip the victor ship comes in with object won; Exult O shores, and ring O bells!

But I with mournful tread, Walk the deck my Captain lies,

Fallen cold and dead.
(Walt Whitman [1855] Leaves of grass)
Conocí a la Dra. Anna Poch en el aňo 1998. Fue mi profesora de Lexicología y Morfología inglesa y de Sintaxis inglesa. Había finalizado mis estudios de Filología Hispánica y dediqué mi último año de carrera a acabar la mención en Filología Inglesa, que tan cautivada me tenía. Me había quedado prendada de las clases de Lengua española y Sintaxis española de la profesora Marisa Santiago y conocer a la Dra. Poch y tener el privilegio de asistir a sus clases de Lexicología y Sintaxis me adentraron en un campo de investigación que empezó a apasionarme enormemente.

Mis planes tras finalizar la carrera iban encaminados hacia la docencia de español para extranjeros, de ahí mi determinación de hacer un máster y
continuar, a ser posible, con mi beca en la EIM, lugar en el que me sentía como en casa. La Dra. Poch fue la artífice de que mis planes iniciales se esfumasen. Me propuso presentarme a una beca del Ministerio e iniciar un doctorado. Casi sin darme cuenta me vi envuelta en la rueda del mundo académico. La beca nunca se materializó pero ella, que siempre contaba con un plan B (o un plan C: "tu no et preocupis, Judith, que tinc moltes alternatives per a tu"), me animó a que me presentase a una plaza del Departamento de Filología Inglesa y Alemana y desde entonces he tenido el privilegio y la satisfacción de ir siempre de su mano.

La recuerdo firme y determinada en el ámbito profesional ("a mi em toca fer de poli dolent, Judith, pero ja entendràs que ho faig pel teu bé", me decía) y a la vez maternal y preocupada por velar por los suyos en su faceta más personal. Siempre sabía qué hacer en cada momento, no daba puntada sin hilo y, como siempre ha comentado la Dra. Verdaguer, "hem de fer allò que diu l'Anna, perquè l'Anna sempre dóna bons consells", Y es cierto, los daba. Por eso, hoy me siento totalmente huérfana porque ahora no la tengo para preguntarle tantas y tantas cuestiones que siempre le consultaba y para las que siempre tenía el teléfono de su casa y su propio hogar disponible. Me recibió muchísimas veces en su salón para animarme cuando flaqueaba y me desanimaba pensando que no acabaría nunca esta tesis, o cuando mis problemas personales, tan acuciantes desde noviembre de 2006, me hacían tirar la toalla. Su casa era un remanso de paz entre tanta zozobra. Solía decir que la casa de uno tenía que ser un espacio vivido y que invitase a los demás a serenarse. También era cierto: siempre salí de esa casa con ilusiones renovadas.

Hoy, pues, estoy triste porque no puedo volver a ese puerto donde atracaban todas mis mareas y porque siento que no le cumplí a tiempo la promesa que le hice de acabar pronto esta tesis. Lo siento, Anna. Lo siento tanto. El 25 de febrero de 2008 te prometí que trabajaría duro en la redacción final de mi trabajo y, meses después, el 5 de junio, tras ese abrazo que me diste al despedirnos, te dije que en julio te traería toda la tesis y que lo celebraríamos juntas. Guardo ese abrazo en mi corazón y también la pena honda de no


#### Abstract

haberte acabado esto a tiempo, pero espero que puedas perdonarme y que allá donde estés puedas ver que llegué (llegamos) finalmente a puerto.


Gracias por los consejos, por las reprimendas a tiempo, por los silencios, por las conversaciones sobre Harry Potter y los whodunnits de H. Mankel, por la paciencia, por enviarme a ese "retiro espiritual" (Birmingham) que resultó ser tan fructífero, por permitirme formar parte de un grupo de investigación tan humano, por darme la oportunidad de conocer a gente tan maravillosa y tan importante en mi vida como la Prof. Eva Giménez y la Dra. Isabel Verdaguer, por aceptar dirigir mi tesis y por la honradez con la que siempre me obsequiaste. GRACIAS, en definitiva, por capitanear todas mis travesías profesionales. Te estoy echando tanto de menos... Nos quedaron pendientes una infinidad de proyectos: modificar y publicar un Text-Guia de Lexicología y Morfología Inglesa, visitar Birmingham juntas y alquilar un coche para explorar sus alrededores, seguir analizando adjuncts, materializar esa base de datos léxica que estabas ideando, probar esa famosa crema de zanahorias con agua de Vichy y ... un largo etcétera. Nos quedan pendientes, Anna. Espero que algún día podamos llevarlos a cabo juntas.

Te quiero mucho, Capitán, Mi Capitán

Birmingham, 13 de junio de 2008

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## CHAPTER 1: INTRODUCTION

Corpus-based studies have drawn the attention to the study of the lexicon as the central principle in language and have also emphasised the interconnections between lexis and syntax (Francis 1993; Hunston \& Francis 2000; Wray 2002, among others). Linguistic investigation of naturally-occurring data has revealed that language is organised in terms of a lexico-grammar and, thus, it consists of recurrent patterns of words (Renouf \& Sinclair 1991; Sinclair 1991; Altenberg \& Tapper 1998; Stubbs 2001). The study of how words are used to make meanings; in other words, how meaning maps onto use, is one of the key concerns in current research in phraseology.

Phraseological empirical studies have confirmed the important role of prefabricated expressions in the textual development of meaning (Gledhill 2000b; Kaszubski 2000) and have also highlighted the need for further research on the phraseological conventions characteristic of specialist genres. As Kaszubski (2000) points out:

> "Word combinations are inextricably related to the layer of style -the appropriateness and/or naturalness of selection and co-occurrence of items, subject to genre-sensitive restrictions and conventions. Thus, in order to compare aspects of lexical use, one is bound to focus attention on phraseology." (Kaszubski 2000:2)

Specifically, in the field of Language for Specific Purposes (LSP), corpus linguistics has established itself as a fundamental methodological tool for determining the defining linguistic features of different discourse communities (Swales 1990; Lee 2001; Gledhill 2000; Lee \& Swales 2006).

It has been long acknowledged (Carter 1998, Williams 1998; Biber 2006; Hyland 2008) that writing a text not only entails the accurate selection of correct terms and grammatical constructions but also a good command of appropriate lexical combinations and phraseological expressions. This assumption becomes especially apparent in scientific discourse, where a precise expression of ideas
and description of results is expected. Several scholars (Gledhill 2000; Flowerdew 2003; Hyland 2008) have pointed to the importance of mastering the prototypical formulaic patterns of scientific discourse so as to produce phraseologically competent scientific texts.

Research on specific-domain phraseology has demonstrated that acquiring the appropriate phraseological knowledge (i.e. mastering the prototypical lexicogrammatical patterns in which multiword units occur) is particularly difficult for non-native speakers, who must gain control of the conventions of native-like discourse (Howarth 1996/1998; Wray 1999; Oakey 2002; Williams 2005; Granger \& Meunier 2008).

The present dissertation aims to analyse native and non-native speakers' usage of five abstract nouns, i.e. agreement, comparison, conclusion, contribution and decision, in medical English. In order to explore non-native speakers' lexical and phraseological command of the five selected nouns, a worksheet of four exercises was distributed among a community of twenty-four Spanish doctors, who were practising medicine in three different Spanish hospitals; namely, Complejo Hospitalario Universitario de Albacete, Hospital Universitario Puerta de Hierro and Hospital de Navarra (cf. chapter 3).

With the aim of assessing non-native speakers' phraseological competence regarding the use of abstract nouns, their written production will be compared against a native corpus. Thus, it can be claimed that this investigation also attempts to contribute to the linguistic characterisation of the discourse of medical science. More precisely, this thesis project intends to explore native speakers' prototypical lexico-grammatical patterns around the five abstract nouns under investigation. This analysis is based entirely on corpus evidence, since all collocational patterns discussed have been extracted from the Health Science Corpus (HSC), which consists of a 4 million word collection of health science (i.e. medicine, biomedicine, biology and biochemistry) texts, specifically compiled for the current research study (cf. section 3.2). The exploration of the collocational behaviour of abstract nouns in medical English will serve as a benchmark against which to measure non-native speakers' production.

### 1.1 Research questions underlying this thesis project

As already stated, this study mainly aims at identifying non-native speakers' problem areas when using medical English and, in particular, their phraseological competence as far as the usage of abstract nouns is concerned. Throughout this investigation, three basic research questions are pursued, which the planned study will aim to answer:
(i) Are Spanish doctors aware of the particularities of the medical genre?
(ii) What are the main difficulties the phraseological patterns of abstract nouns in medical English pose for the non-native speakers' medical community?
(iii) What are the prototypical usage patterns around the following abstract nouns: agreement, comparison, conclusion, contribution and decision in medical English?

The first research question addresses the issue of whether Spanish doctors are competent enough in English so as to express themselves in medical literature. With the aim of exploring the way in which non-native speakers make particular collocations for scientific writing, a worksheet of exercises, purposely designed for this thesis project, was distributed among 24 Spanish doctors. The findings obtained from their written production will be compared against native data. This comparison will provide information about their knowledge of the collocational patterns associated with the abstract nouns under study.

The second research question investigates the difficulties posed by the phraseological patterns of abstract nouns in medical genre. The analysis of nonnative speakers' production of abstract noun collocations in the exercises will provide information about the problem areas (e.g. overuse and/or underuse of collocational patterns, lexical bundles, and formulaic expressions) Spanish doctors encounter when using abstract nouns, such as agreement, comparison, conclusion, contribution and decision in scientific articles.
The third research question looks at the collocational patterns of the selected five nouns that typically occur in the health science discourse. In order to answer the first research question; that is, non-native speakers' command of the
phraseological behaviour of abstract nouns in medical papers, a native corpus will be explored as a comparison measure. All the observations made concerning native phraseological and collocational usage of abstract nouns will thus serve to determine Spanish doctors' phraseological competence in scientific English.

### 1.2Outline of the thesis structure

This thesis consists of six chapters; namely:
a) Chapter 1: "Introduction"
b) Chapter 2: "Literature review and theoretical framework"
c) Chapter 3: "Methodology"
d) Chapter 4: "Data Analysis: the collocational patterning of abstract nouns in the Health Science Corpus (HSC)"
e) Chapter 5: "Informants' Data Analysis"
f) Chapter 6: "Conclusions, implications and further research"

Chapter 1, the present one, is concerned with three research questions that motivated this thesis project, explaining why the investigation is undertaken and what the expected outcome will be. As mentioned earlier, the planned study is an attempt at comparing the lexical and phraseological command of non-native speakers in the use of five selected English abstract nouns. The expected outcome is a needs analysis of a Spanish medical community as far as their phraseological competence in scientific English is concerned. Finally, the present section (1.2) offers an outline of the structure of the actual research study.

Chapter 2, "Literature review and theoretical framework", focuses on earlier studies in the field of corpus linguistics as a methodological tool and describes the theoretical foundation of the conducted research. The literature review in chapter 2 starts by describing the wide range of disciplines that can benefit from a corpusbased approach to the study of language. Section 2.2 presents a lexical approach to linguistic analysis adopted in this research. An overview of the notion of lexicogrammar and the interrelationship of lexis and syntax in descriptive linguistics is followed by a summary of the different definitions applied to the term collocation and Sinclair's "idiom principle" (section 2.3). Section 2.4 closes this chapter by exploring the role of phraseology in writing in general and, in specialised registers,
in particular (2.4.1) and by summarising the current research studies on non-native speakers' phraseological competence (2.4.2).

Chapter 3, "Methodology", describes the methods employed in the research study. Section 3.1 establishes the rationale for using a corpus-based approach. Sections 3.2-3.5 present the procedures followed in the native corpus ${ }^{1}$ compilation (3.2) and the materials designed to elicit informants' data; namely, a Survey (3.3) and a worksheet of exercises (3.5). A brief summary of the inquiry methods employed is included in section 3.6.

Chapter 4, "Data Analysis: the collocational patterning of abstract nouns in the Health Science Corpus (HSC)", seeks to explore the collocational behaviour of five abstract nouns (i.e. agreement, comparison, conclusion, contribution and decision) in the HSC. Following an introduction to the chapter (4.1), section 4.2 offers an overview of the lexico-grammatical patterning of abstract nouns in the health science discourse. Two main linguistic processes; i.e. delexicalisation and grammaticalisation, will be considered thoroughly as the analysis of the patterns of abstract nouns in the HSC has revealed that both phenomena play an important role in the characterisation of such patterns. Sections 4.3-4.7 concern the native corpus analyses with reference to the particular phraseology of each of the five abstract nouns in question. This lexico-grammatical description is followed by section 4.8, which reports on the results obtained and focuses on four linguistic processes observed:
a) delexicalisation in restricted verb-noun collocations
b) grammaticalisation in lexical bundles
c) high use of periphrastic structures in the passive voice
d) preference for adjective collocates used in attributive position

Chapter 5, "Informants' Data Analysis", aims to provide answers to research questions 1 and $2^{2}$, formulated in section 1.1, by means of discussing the results

[^0]obtained in the worksheet of exercises distributed among informants. Section 5.2 provides a general summary of all the findings of the study, which, on the whole, seem to indicate that despite being aware of certain domain-specific collocations, Spanish doctors lack knowledge of how to use them correctly. Section 5.3 closes this chapter by discussing informants' opinions of their linguistic skills and needs, as stated in the Survey. While the problem areas identified in section 5.2 are based on the analysis of non-native speakers' performance in the worksheet of exercises, the difficulties discussed in the final section of chapter 5 have been extracted from informants' own view of the kind of linguistic help that might contribute to improve their scientific writing in English.

In chapter 6, "Conclusions, implications and further research", section 6.1 relates the obtained results to the research questions formulated in the introduction (cf. section 1.1). A summary of the main findings of the analysis of both the native and non-native data (section 6.2) is then followed by a number of implications of the results for the teaching and learning of phraseological units in specialist registers (section 6.3). Section 6.4 concludes the present dissertation by suggesting future research areas in the field of phraseology in EFL and ESP that need to be further explored.

Finally, a list of bibliographical references and eight appendices ${ }^{3}$ conclude this thesis dissertation. The next chapter will set up the literature review that informed the present study.

[^1]
## CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

In this chapter, a literature review is presented with the aim of establishing the theoretical and methodological framework within which this thesis project was carried out. In section 2.1, the role of corpus linguistics as a methodological tool in linguistic inquiry is explored, by providing a general account of the numerous linguistic disciplines which can benefit from corpus-based research. The following section (2.2) will serve as the theoretical foundation of the present study, which is framed within the lexico-grammar approach to language description and, thus, emphasises the association between pattern and meaning. Section 2.3 addresses the notion of collocation in the light of Sinclair's 'idiom principle'. A general overview of the different terms this concept has been associated with as well as its various classificatory attempts is provided. The chapter ends with a discussion of the role of phraseology in English research writing, paying special attention to specialised registers (2.4.1), followed by an examination of current empirical research on phraseology in foreign language learning (2.4.2).

### 2.1 Corpus linguistics as a methodological tool to explore language

Over the past decades, there has been an increasing interest in data-oriented language research. Corpus linguistics is currently seen as a way of doing linguistics, rather than a separate linguistic discipline (Meyer 2002: xi), whose object of inquiry is a collection of texts upon which different linguistic analyses can be conducted. To this respect, it is also worth mentioning that corpus linguists rely their corpus-based studies on actual instances of language instead of self-created examples. Therefore, the observation of naturally occurring data allows empirical contextualised analyses, which constitutes a valuable methodological tool in linguistic description. In this thesis project, corpus linguistics is also viewed as a methodology rather than as a strand of linguistics on its own.

As McEnery et al. (2006) state, empirical studies based on corpus data collection date back to the pre-Chomskyan period. Field linguists (e.g. Boas 1940) and structuralists (e.g. Sapir 1949; Bloomfield 1933) made use of the


#### Abstract

corpus methodology in their linguistic studies. However, such methodology was largely pushed aside in the 1950s by generative linguistics, partly due to the fact that language was considered to be productive and generativists (e.g. Chomsky 1957/1965) claimed that corpus linguistics could only inform about the language that had already been produced.


Although generativists and corpus linguists may have different goals in mind: "while the generative grammarian strives for explanatory adequacy (...), the corpus linguist aims for descriptive adequacy" (Meyer 2002:1), it has been demonstrated that corpus research can make an enormous impact on the creation and development of linguistic theories:
> "corpora can be invaluable resources for testing out linguistic hypotheses based on more functionally based theories of grammar, i.e. theories of language more interested in exploring language as a tool of communication." (Meyer 2002:2)

Meyer (2002) further discusses the role of corpus studies in linguistics. He claims that there is no sharp dividing line between descriptive linguists, whose linguistic studies are often based on corpus observation, and theoretical linguists, who are more concerned with building up linguistic theories. On the contrary, despite their differences, Meyer states that both types of linguists can benefit from each other:
"while the goals of the corpus linguist and the generative grammarian are often different, there is an overlap between the two disciplines and, in many cases, the findings of the corpus linguist have much to offer to the theoretical linguist." (Meyer 2002: xiv)

As advocated by McEnery et al. (2006), "the key to using corpus data is to find the balance between the use of corpus data and the use of one's intuition" (McEnery et al. 2006:7). In this view, the more traditional intuition-based approach (Chomsky), which relied on native speakers' introspection of what was considered to be grammatically correct/acceptable in their language, and
the corpus-based approach (Sinclair 1992a; Francis, Hunston \& Manning 1996; Singleton 2000; Reppen et al. 2002; Halliday et al. 2004; among others) must be considered as mutually inclusive (Leech 1991; McEnery et al. 2006):

> "Neither the corpus linguist of the 50 s , who rejected intuition, nor the general linguist of the 60 's, who rejected corpora data, was able to achieve the interaction of data coverage and the insight that characterise the many successful corpus analyses of recent years." (Leech 1991:14)

It would certainly be unwise to claim that a compiled collection of texts, regardless of its size, can be representative of all the possible instances of a language. Nevertheless, the use of computer-based corpus material is currently seen as a very useful methodological tool in linguistics. With the possibility of storing large electronic corpora that computers provide with and the help of concordance techniques and other computer-assisted methods (i.e. frequency analyses, study of the distribution of lexical items throughout a text and calculation of the keyword sequences for particular words, to name but a few), linguists can now observe characteristics and verify results which are not apparent to a native speaker's intuition (Francis, Hunston \& Manning 1996; Chief et al. 2000)

Both approaches, i.e. the use of the linguist's intuition and empirical data, can enrich language description if understood as complementary. As Fillmore (1992) points out:
> "I don't think there can be any corpora, however large, that contain information about all of the areas of English lexicon and grammar that I want to explore (...) [but] every corpus I have had the chance to examine, however small, has taught me facts I couldn't imagine finding out any other way. My conclusion is that the two types of linguists need one another." (Fillmore 1992: 35)

Due to the growing awareness of the importance of analysing real language in use, corpus linguistics has lately had a great impact on language description
theories. According to Gledhill (2000b), this rapidly expanding area of research has given rise to three clearly distinct corpus linguistics schools; namely, a) corpus-based studies in computational linguistics (Butler 1985; Oakes 1998); b) corpus-based research on corpus tagging, parsing and information retrieval (McEnery \& Wilson 1996; Biber et al. 1998; Danielsson 2003) and c) the use of corpus analysis to investigate issues that have different applications in modern linguistics, such as language acquisition and language learning (Barnbrook \& Sinclair 1995; Barnbrook 1996; Granger 1998; Altenberg \& Tapper 1998), contrastive and translation studies (Baker 1993, 1996; Johansson \& Hofland 1994; Schmied \& Schäffler 1996; Bernardini \& Zanettin 2000), historical linguistics (Nevalainen \& Raumolin-Brunberg 1996; Rissanen 2000) and the creation of lexicographical works (Renouf \& Sinclair 1991; Bogaards 1996; Cowie 1999; Moon 2007a/b/c) as well as grammar reference books (Quirk et al. 1985; Biber et al. 1999).

All the above corpus-based research areas seem to corroborate that the use of corpora is a very effective methodological tool from which numerous linguistic disciplines can benefit. Meyer (2002) highlights the various applications of the corpus linguistics methodology as a new means of exploring language which contributes successfully to the development of linguistic studies:
"[The use of] corpora [has] numerous uses, ranging from the theoretical to the practical, making them valuable resources for descriptive, theoretical, and applied discussions of language. Because corpus linguistics is a methodology, all linguists -even generativists- could in principle use corpora in their studies of language (...) corpora (...) are used for creating dictionaries, studying language change and variation, understanding the process of language acquisition, and improving foreign -and second- language instruction." (Meyer 2002:28)

Nowadays, much corpus-based research (i.e. the creation of lexicographical works and reference grammars, historical analyses of the evolution of language over a period of time and studies on the phraseology characteristic of
specialised discourse communities, among others) is grounded on the analysis of large bodies of texts. The extensive use of both spoken and written corpora and the development of computer-aided tools to exploit such corpora have favoured the production of research studies, based on corpus evidence, on the already mentioned linguistic disciplines, which will be further discussed in the following pages.

### 2.1.1 Corpus-based research in language description

Data-oriented language research has proven that linguistic analyses can greatly benefit from the observation of real language in use; that is, naturally-occurring data. As a result, the past decades have witnessed an explosion of corpus studies on the usage of different grammatical patterns and multiword units, such as lexical bundles in freshman compositions (Cortes 2002) and their distribution across registers (Hyland 2008); prototypical collocations in science writing (Gledhill 2000b); patterns and meaning (Hunston \& Francis 2000); verb complement constructions (Altenberg 1993); delexical chunks (May Fan 1999; Tognini-Bonelli 2001); delexicalised restricted verb-noun collocations in scientific English (Verdaguer \& Laso 2006), introductory it patterns (Groom 2005); transitive and intransitive uses of eat and drink in English (Newman \& Rice 2006); modal verbs (Coates 1983), reporting clauses used in citation (Charles 2006); the phraseology characteristic of the verb make (Granger, Paquot \& Rayson 2006); the phraseological patterns of make and take in EFL textbook materials (Gouverneur 2008); among others.

### 2.1.2 Corpus-based research in dictionary-making

The creation of dictionaries based on corpus evidence stands out as one of the most prominent applications of corpus linguistics: "corpora are now commonplace as lexicographical resources" (Moon 2007c:165). Since the first edition of the Collins Cobuild ${ }^{4}$ English Dictionary (CCELD) ${ }^{5}$, first published in 1987, many dictionary-making projects have been based on corpus data. As Cowie (1999) highlights, the influence of Sinclair et al.'s Cobuild project in lexicography is thus undeniable: "Sinclair and the Cobuild project have

[^2]contributed enormously to the development of EFL lexicography, in particular, and dictionary-making in general' (Cowie 1999:128). Similarly, Carter (1998) claims that the corpus-based research carried out at the University of Birmingham (Cobuild project) has contributed enormously to the development of many lexicographically relevant works:

> "[the influence of the Cobuild project] can be measured by the fact that by the late 1990s all major English-language learner dictionary projects have incorporated reference to extensive language corpora and developed computational techniques for extracting lexicographically significant information from such corpora." (Carter 1998:167)

Without a doubt, the use of corpus data along with the software tools employed in its analysis have both speeded the process of elaborating a lexicographical work: "because so much text is now available in computer-readable form, many stages of dictionary creation can be automated' (Meyer 2002:16). The advances made in corpus technology have thus been a determining factor in the recent proliferation of corpus-based dictionaries, such as the Cambridge International Dictionary of English (1995), the Longman Dictionary of Contemporary English (2005) and the Macmillan English Dictionary (2007), which have relied upon the following repositories of corpus evidence: the Cambridge International Corpus and the Cambridge Learners' Corpus, the British National Corpus (BNC) and the World English Corpus ${ }^{6}$, respectively.

### 2.1.3 Corpus-based research for the production of grammar reference books

By analysing the lexico-grammar of grammatical constructions, the information obtained from corpus analysis can also be used as the basis for the creation of reference grammar books that provide a comprehensive description of language. Some examples can be found in the following corpus-based modern grammar works: Quirk et al.'s A Grammar of Contemporary English (1972) and

[^3]A Comprehensive Grammar of the English Language (1985), some analyses of which were based on corpus data extracted from the London Corpus; Greenbaum's Oxford English Grammar (1996), based on the analyses of the British examples of the International Corpus of English; Biber et al.'s Longman Grammar of Spoken and Written English (1999), informed by the Longman Spoken and Written English Corpus, as well as a whole series of grammar works that developed from the Collins Cobuild English Grammar (1990), which contain actual examples from the Bank of English Corpus.

It is worth noting that the above corpus-based grammar books do not display grammatical constructions in isolation. On the contrary, pedagogical grammars of this kind aim to help users associate meanings with structures by providing information not only on the form but also on the usage of actual words and phrases. As Meyer points out, "one of the principles underlying these grammars is that a complete description of English entails information not just on the form of grammatical constructions but on their use as well." (Meyer 2002:14).

### 2.1.4 Corpus-based research in language acquisition and language instruction

In the last few years a growing interest in the creation of learner corpora has been especially noticeable. This kind of corpora has given rise to many corpusbased studies (Altenberg \& Tapper 1998; Aston 2001; Cortes 2002; Granger 1998/2003; Conrad 2005; Meunier \& Granger 2008; among others) which focus mainly on the analysis of non-native speakers' performance in a second or foreign language.

The information obtained from learner corpora like the International Corpus of Learner English (ICLE ${ }^{7}$, the Longman's Learner Corpus ${ }^{8}$, the Learner Corpus (Milton \& Freeman 1996) and the Hong Kong University of Science and Technology (HKUST) has the potential to enhance the teaching and learning of both second and foreign languages since its analysis can help researchers

[^4]design more effective Second Language (SL) and Foreign Language (FL) pedagogical materials.

In addition, Meyer (2002) advocates that non-native speakers' language learning process can also benefit from corpus analysis ("data-driven learning", as labelled by Johns 1991/1994 and Hadley 1997). By observing a corpus of native-speaker production, learners get access to examples of real language rather than artificially created instances. Then, the information generated by concordancing programmes will enable "the student [to] conduct inductive explorations of grammatical constructions" (Meyer 2002:27-28) which can contribute to a successful learning experience.

Retrieving information from a corpus has thus proven to be a fundamental resource for any language user, as it provides them with new insights into language structure and use. According to Tsui (2004: 42), EFL learners are not sufficiently exposed to the target language so as to be able to acquire that language efficiently on their own. Consequently, the use of corpora in an EFL context contributes to fill that gap since it allows learners to focus on naturallyoccurring utterances as well as highly-frequent combinations of words. Among its other notable contributions to the teaching of EFL, it must be stressed that corpus linguistics offers "objective quantitative evidence of the distribution of lexical items on which the contents of the curriculum can be based." (Tsui 2004: 41).

As already discussed, prior to the emergence of corpora, linguistic descriptions used to rely on native speakers' intuition regarding language use; that is, it was merely based on the way they perceive language to be rather than on the way language is naturally used. The intuition learners may have (especially being non-native speakers) should be backed by corpus evidence. Needless to say that EFL learners have less intuition about second language use than native speakers (Carter 1998); however, the use of corpus linguistics techniques in the classroom enables the former to become language researchers, and, as a result, they gain more autonomy as language learners since they realise they
have means of acquiring language knowledge from their observation of real language, rather than merely depending on teacher's instructions.

Another worth mentioning contribution of corpus linguistics to the field of second and foreign language acquisition lies in the creation of newly designed teaching materials and linguistic resources, such as lexical databases, which incorporate recurrent combinations of words and trigger class discussions as regards the analysis of language behaviour.

The corpus research conducted in this dissertation describes the language characteristic of medical discourse from an empirical perspective and thus makes use of corpus linguistics as a methodological tool rather than a mere technology. The analysis carried out in this thesis will highlight the benefits of such a methodology not only in language description but also in language learning and language teaching.

### 2.2 Lexico-grammar and the association between lexis and syntax in descriptive linguistics

Over the last few decades, work on corpus linguistics has stressed the interaction between lexis and grammar in language as well as the importance of collocational and colligational patterning in the construction of meaning ${ }^{9}$. This issue concerning the fluidity between lexis and syntax seems to have strayed a long way from traditional descriptions of language, which showed a sharp separation between the already mentioned linguistic domains:
"Throughout the history of language study there has also been an unchallenged acceptance of the individual, independent word as the repository of meaning." (Carter 1998:62)

On the contrary, theoretical and applied linguistics have lately focused their attention on the fact that lexis and grammar should not be viewed as separate

[^5]levels of language. Within this framework, grammar is regarded as a "heavily constrained and abstract form of vocabulary rather than a separate linguistic level' (Gledhill 2000b:74); that is, both grammar and vocabulary are understood as two ends of the same spectrum. The following quotations from various linguists illustrate this approach to linguistic description:
"Grammar and vocabulary are not two different things; they are the same thing seen by different observers." [Emphasis added] (Halliday 1992:63)
"Particular syntactic structures tend to co-occur with particular lexical items, and -the other side of the coin- lexical items seem to occur in a limited range of structures. The interdependence of syntax and lexis is such that they are ultimately inseparable, and it becomes merely a methodological convenience to regard them as different perspectives from which to view language use." [Emphasis added] (Francis 1993:143)

> "the relationship between syntax and lexicon may therefore be more fluid than is usually supposed: under some circumstances an expression may be retrieved from the lexicon as a single unit; under others it may constructed from partially assembled pieces in the lexicon, requiring somewhat more syntactic processing (...) Syntax and lexicon are thus seen to be complementary in a dynamic and redundant way." [Emphasis added] (Peters 1983:90)

At the heart of this view of the intimate connection between grammar and meaning is the notion of lexico-grammar (Halliday 1992) / pattern grammar (Hornby $1954{ }^{10}$ ), which gives account of the patterned nature of language. Within this approach to language description, the concept of pattern becomes central to the way discourse is construed (Halliday \& Martin 1993), in the sense that it represents a link between lexis, grammar and meaning:

[^6]"There are two main points about patterns to be made: firstly, that all words can be described in terms of patterns; secondly, that words which share patterns, share meanings." (Hunston, Francis \& Manning 1997:209)

As Hunston (2002) points out, this linguistic theory dates back to Hornby's (1954) work but it has its theoretical roots in Sinclair's (1991) observations that words tend to occur in typical phraseologies and meanings are often expressed in a variety of combinatorial patternings. This neo-Firthian conception of language analysis understands that grammar and lexis must be treated as intertwined very tightly in linguistic description. Hunston \& Francis' (2000) pattern grammar gives priority not only to the behaviour of individual lexical items but also to the patterns they form part of (Francis et al. 1996/1997/1998; Hunston \& Francis 1998/2000), which implies that the "semantics of a word [is seen] as textually distributed, and syntax as intimately linked with lexical knowledge. " (Gledhill 2000a:131).

Bearing in mind that "any identification of a recurring pattern rests on observation" (Hunston 2007:259), work on corpora has recently become a commonplace for lexico-grammatical studies, since the use of naturallyoccurring data allows descriptions of meaning that give account of lexicogrammatical patternings. As already stated (cf. section 2.1), growing research tradition focusing upon corpus linguistics has largely contributed to emphasising the unity of lexis and grammar, which extends the boundaries of a given initial unit, giving rise to the creation of extended units of meaning. (Tognini-Bonelli 2001:24).

It is today widely assumed that one of the areas in which the corpus (r)evolution has had greater impact is on the study of lexis. Singleton (2000) notes that Chomskyan approach to syntax (i.e. generative grammar) since the early 1950s has gradually evolved into a new linguistic perspective which prioritises the study of the lexis as the central principle of language, to the extent that a general trend towards lexical approaches to linguistic analysis can be traced (Willis 1990; Lewis 1993; Singleton 2000; Hunston 2002). The lexicon which
had been neglected for a long time (i.e. Saussure, the structuralists of the Prague School and the Chomskyan modern linguists were more interested in the study of the structure of language, which was regarded as a system of rules), as it was assumed to be a list of irregularities, has recently achieved a salient position in linguistic studies:

> "an increasing number of applied linguists are beginning to address such questions. Vocabulary is now on the agenda in several domains of applied language study." (Carter 1998:282)

It is thus important to note that the present revival of the lexicon is closely related to the advent of corpus linguistics, which, as mentioned earlier, has played a fundamental role in the development of linguistic frameworks which bring to the forefront the syntagmatic relations of lexical items as well as the notion that lexical choice is prior to the selection of grammatical patterns (Sinclair 1991; Francis 1993; Hunston \& Francis 2000):

> "lexis is communicatively prior to syntax. As communicators we do not proceed by selecting syntactic structures and independently choosing lexical items to slot into them. Instead, we have concepts to convey and communicative choices to make which require central lexical items, and these choices find themselves syntactic structures in which they can be said comfortably and grammatically." (Francis 1993:142)

The pervasiveness of this lexical approach to linguistic description has brought about a wide range of studies that understand lexis as "systematically structured through patterns of use" (Hyland 2008:6). Firth, founder of the "London School of Linguistics", and his followers (e.g. Sinclair, Halliday) took the view that the meaning of a lexical item could equal the sum of its linguistic environments; that is, the analysis of the collocates of a word would provide a great deal of information about its meaning. As Sinclair (1991) claims:


#### Abstract

"By far the majority of text is made of the occurrence of common words in common patterns, or in slight variants of those common patterns. Most everyday words do not have an independent meaning, or meanings, but are components of a rich repertoire of multi-word patterns that make up a text. This is totally obscured by the procedures of conventional grammar." (Sinclair 1991:108)


In Sinclair's view, meanings are not independent selections. On the contrary, the close interrelationship between lexical items and their context of occurrence, often referred to as collocation, is considered to play an important role in the interpretation of texts. This thesis is built upon the notion of lexicogrammar, which approaches language as a unitary system where grammar and the lexicon are two different perspectives of the same continuum rather than two different systems. The following section provides an overview of the notion of collocation and summarises its different uses in the literature.

### 2.3 Sinclair's notion of collocation

In the previous section, some of the theoretical issues surrounding the notion of collocation were set out. It is now turn to focus on what was meant by Firthian linguists when they first coined that term and the different uses it embraces nowadays in modern linguistics.

As discussed in the related literature, the "London School of Linguistics" (Firth, Sinclair, Halliday) used, in broad terms, the notion of collocation to refer to the environments in which a word occurs ${ }^{11}$; that is, it is based on the assumption that certain words tend to appear in combination and that, consequently, they should not be described in isolation, but rather in terms of the patterns they belong to (Francis, Manning \& Hunston 1997). This intersection between grammar and lexis, embodied in the concept of collocation, has received increasing attention in modern linguistics in recent years. The analysis of the collocational properties of words is now considered to be fundamental in descriptive linguistics (cf. section 2.2) since it provides substantial information

[^7]about the phraseologies characteristic of different genres and registers (Howarth 1996; Gledhill 2000a/b; Conrad 2000; Lee 2001; Groom 2005; Hyland 2008). As Groom (2005) states:

> "It is reasonable to suppose that different genres and disciplines might make differential use of these phraseological resources." (Groom 2005:263)

Although the concept of collocation has been used in many different and rather vague ways, it is generally agreed that it refers to a habitual combination of words: "a meaningful relationship between two words in each other's environment' (Tognini-Bonelli 2000:209). Sinclair's definition of the term collocation: "the occurrence of two or more words within a short space of each other in a text" (Sinclair 1991: 170) emphasises the fact that the use of one word in a text affects the co-occurrence of its collocates (Barnbrook 1996:88). He claims that:

> "The choice of one word conditions the choice of the next, and of the next again. The item and the environment are ultimately not separable, or certainly not separable by present techniques." (Sinclair 2004:19)

Thus, in this context, word co-occurrence is viewed as crucial in the interpretation of texts. Sinclair's description of collocation led to his well-known "idiom principle":
"The principle of idiom is that a language user has available to him or her a large number of semi-preconstructed phrases that constitute single choices, even though they might appear to be analysable into segments. To some extent, this may reflect the recurrence of similar situations in human affairs; it may illustrate a natural tendency to economy of effort or it may be motivated in part by the exigencies of real-time conversation." (Sinclair 1987:320)

He suggests that there are two governing principles of language organisation: the "open-choice principle" and the "idiom principle". While the former approaches lexis and syntax as two separate language domains, the latter refers to the tendency of language towards the creation of phrases and idioms:

> "a model of language which divides grammar and lexis, and which uses the grammar to provide a string of lexical choice points, is a secondary model (...) It has an abstract relevance, in the sense that much of the text shows a potential for being analysed as the result of open choices, but the other principle, the idiom principle, dominates. The open choice analysis could be imagined as an analytical process which goes on in principle all the time, but whose results are only intermittently called for." (Sinclair 1991:114)

Within this frame, Sinclair's "idiom principle" draws attention to the inadequacy of the "open-choice principle" to account for meaning in language:


#### Abstract

"It is clear that words do not occur at random in a text, and that the open-choice principle does not provide for substantial enough restraints on consecutive choices. We would not produce normal text simply by operating the open-choice principle (...) [T]he principle of idiom is put forward to account for the restraints that are not captured by the open-choice model." (Sinclair 1991:110)


According to Barnbrook (2007), the grammatical models of language suggested by the "open-choice ("slot-filler") principle", on which most grammars are based, entail a biased view of language since they fail to identify the phraseologies typically associated with words. Within this "slot-filler" model, words are seen as being selected individually in order to occupy (fill) a position (slot) in the syntactic structure rather than as co-selected in extended units of meanings (i.e. the "idiom principle").

Sinclair's "idiom principle" and his notion of collocation have been hugely influential in corpus linguistics. Highly topical corpus-based studies (Renouf \& Sinclair 1991; Hunston \& Francis 1998; Gledhill 2000b; to name but a few) have stressed the close link between the grammatical form of a string of words (pattern) and its meaning. Current phraseological work has demonstrated that collocations that share specific particular patterns may also convey a closely related meaning (Sinclair 1987/1991; Hunston \& Francis 2000; Gledhill 2000b; Hoey 2005; Groom 2005; Hunston 2007).

From this perspective, lexis and grammar are regarded as equally necessary in describing how meaning is construed (Sinclair 1991), and thus the notion of collocation and the analysis of how some uses of words tend to occur in certain lexico-grammatical patterns have become central in mainstream corpus linguistics.

The study of multiword units and their collocational patternings has been extensively discussed in the literature. Yet while most studies of collocation are grounded, in general terms, on Firth's and Sinclair's notion of collocation as the way words tend to be associated in language, this "togetherness factor" (Singleton 2000) has been referred to with different terms and has also increasingly embraced different uses.

There have been many classificatory attempts of multiword expressions which have given rise to a variety of defining terms such as idioms or idiomatic expressions (Moon 1992; Schmitt 2004); prefabs or prefabricated expressions/routines (Wray \& Perkins 2000); clusters (Scott 1996); chunks (Nattinger\& DeCarrico 1992); formulae or formulaic sequences (Moon 1992); ready-made expressions (Cowie 1988); lexical bundles (Biber et al. 1999/2003/2004; Cortes 2002/2004; Partington \& Morley 2004); word strings, clichés, composite units (Howarth 1996) and lexical phrases (Nattinger \& DeCarrico 1992; Oakey 2002a/b).

As that wide range of labels reflects, the treatment of collocations may be approached from a number of perspectives (e.g. lexicographic, semiotic,
sociolinguistic, psycholinguistic and semantic) and with different goals (e.g. pedagogic, lexicographic) in mind, which will, inevitably, determine the choice of each of the above phraseological items.

Research on the phraseological mechanisms of language has focused not only on the descriptive analysis of word combinations (Becker 1975; Altenberg 1993; Biber et al. 1999; Moon 1998) but also on the role of phraseology on language teaching and learning (e.g. Fillmore's [1979] and Pawley \& Syder's [1983] work on native-like fluency; DeCarrico \& Nattinger's [1988] and Nattinger \& DeCarrico's [1989] studies on lexical phrases in academic lectures and speech acts; Howarth's [1996/1998] analysis of non-native speakers' written academic performance in English and Granger \& Meunier's [2008] study of the role of phraseology in foreign language acquisition and instruction). Both issues will be more thoroughly considered in section 2.4.

Taking into account that, as has been observed, the concept of collocation may be defined in various ways to serve different linguistic purposes, it seems now worth discussing how different traditions have approached the phenomenon of multiword expressions. Howarth (1996) presents a synthesis of how the heading of collocation has been viewed by two ${ }^{12}$ main traditions in which this concept originated; the "Firthian London School of Linguistics", on the one hand and Russian lexicology, on the other. He observes that the main difference between both views is that whereas the former focuses mainly on the concept of collocation on its own, the latter is more concerned with the phraseological classification of word combinations (Howarth 1996:25).

Following on from Firth's notion of collocation, linguists such as Halliday, Sinclair and Hoey have adopted what has been referred to as a "frequencybased, statistical or textual" (Herbst 1996; Nesselhauf 2004; Gledhill 2000b) approach to the study of collocations. In their view, collocations are framed in terms of the frequent co-occurrence of words, rather than on their various

[^8]classifying categories. The following definitions illustrate this statistical perspective:
"Collocation is the syntagmatic association of lexical items, quantifiable, textually, as the probability that there will occur at $n$ removes (a distance of $n$ lexical items) from an item $x$, the items $a, b, c$ (...) Any given item thus enters into a range of collocation, the items with which it is collocated being ranged from more to less probable." (Halliday 1961:276)
"a cover term for the kind of cohesion that results from the cooccurrence of lexical items that are in some way or other typically associated with one another, because they tend to occur in similar environments." (Halliday \& Hasan 1976:287)
"the occurrence of two or more words within a short space of each other in a text. The usual measure of proximity is a maximum of four words intervening. Collocations can be dramatic and interesting because unexpected, or they can be important in the lexical structure of the language because of being frequently repeated." (Sinclair 1991:170)
"[The term collocation refers to] the relationship that a lexical item has with items that appear with greater than random probability in its textual context." (Hoey 1991:6)

The above quotes highlight the statistical probability of certain words to occur in combination, which has proven to be of great value, particularly in computational studies of syntagmatic relations of multiword expressions (Nesselhauf 2005:12). However, Howarth (1996) argues that:
"collocation is not purely a matter of probability of linear cooccurrence, since there are grammatical and semantic or purely lexical factors that constrain lexical co-occurrence in a large number of cases. One of the tasks facing the lexicologist constructing an integrated model for composite units is to

> make general descriptive statements about lexical relationships between items which are highly diverse in nature, extremely numerous, very hard to measure quantitatively and about which speakers of the language have differing opinions." (Howarth 1996:29)

In this context, he takes account of the treatment of collocation in the "semantic/syntactic" (Gledhill 2000b) tradition, also known as "significanceoriented" (Herbst 1996) or "phraseological" (Nesselhauf 2004) approach, which is rooted in Russian lexicology. Unlike the "statistical/textual" approach, the "semantic/syntactic" model defines collocation as a type of word combination in a certain grammatical context. The emphasis is not on the frequency of occurrence of expressions but on their combinatory possibilities since, in Gledhill's (2000b) view, collocations are "typically seen either as units of meaning (lexical items or idioms) or units of grammar (phrases)." (Gledhill 2000b:9).

As referred to in Howarth (1996) and Nesselhauf (2005), the work of linguists such as A. P. Cowie (1992/1994/1998), Greenbaum (1970), Mel'čuk (1998) and Hausmann (1989) can be included in this phraseological approach, whose main aim consists of describing phraseological expressions as well as analysing their different typologies. According to Howarth (1996), the most salient defining trait of this approach is that

> "it sees no watertight division between the various types of collocation and idiom, rather a continuum from, at one extreme, the most freely co-occurring lexical items and transparent combinations to, at the other, the most cast-iron and opaque idiomatic expressions." (Howarth 1996:32)

From this phraseological perspective, thus, the term collocation is being used to refer to different phraseological categories, ranging from highly fixed (idiomatic)
expressions ${ }^{13}$ (e.g. spill the beans, blow the guff, kick the bucket, foot the bill) ${ }^{14}$ to unrestricted ("free combinations") word sequences ${ }^{15}$ (e.g. run a business, explode a bomb, drink tea) ${ }^{16}$.

Regardless of the fact that the distinction between the various types of word combinations suggested by Cowie (1981) is sometimes difficult to delimit from a purely semantic point of view (Van der Wouden 1997; Gledhill 2000b),
> "you cannot predict that the meaning of sleep like a log will denote an intense form of sleeping, but after you have learned what it means, you see that like a log is an intensifier. The essence of collocation is that the assignment of like a log to the meaning 'very' does not feed any other combinations. So even though we have a meaning for it, that meaning is only valid in a certain collocation." (Van der Wouden 1997:54-55)

it cannot be denied that Cowie's (1994) approach to collocation as the "association of two or more lexemes (or roots) recognized in and defined by their occurrence in a specific range of grammatical constructions" (Cowie 1994:3169) has proven remarkably influential in collocational studies, since it has underlined the assumption that the elements that constitute sequences of words/word associations (understood as abstract combinations) are syntactically related (Nesselhauf 2005).

Although fuller attention has been accorded to the two approaches discussed so far; namely, the "frequency-based approach" and the "phraseological approach", it is important, nonetheless, to note that some other perspectives have defined the term collocation in other ways, highlighting numerous other collocational properties. It seems worth mentioning, for instance, Gledhill's (2000b) "discoursal/rhetorical approach" to the definition of the scope of the

[^9]notion of collocation. He argues that apart from analysing recurrent strings of words and examining their syntactic and semantic structure, collocations can also be observed from a discoursal point of view; that is, by examining their rhetorical function in a given discourse:
"From this perspective, idioms such as to get the sack, to be fired can be contrasted stylistically with less marked expressions: to be dismissed, to lose one's job. The difference between these expressions lives in their emphasis or rhetorical effect (...)" (Gledhill 2000b:13)

Gledhill's model is therefore more concerned with the pragmatic role of phraseological units, which has been broadly discussed in the field of discourse analysis ${ }^{17}$. As he notes, this approach goes beyond Halliday's "syntagmatic association of lexical items" (Halliday 1961) and Howarth's "collocational continuum" (Howarth 1996/1998) and focuses on the pragmatic textual function performed by collocations and idioms in the construction of discourse.

Within this model, the emphasis is shifted to the role of lexical phrases in discourse:

> "Lexical phrases are parts of language that often have clearly defined roles in guiding the overall discourse. In particular, they are the primary markers which signal the direction of discourse, whether spoken or written. When they serve as discourse devices, their function is to signal, for instance, whether the information to follow is in contrast to, in addition to or is an example of information that it to proceed." (Nattinger \& DeCarrico 1992:60)

All in all, although each of the abovementioned approaches (i.e. statistical, phraseological and rhetorical) to the phenomenon of collocation foregrounds different properties of multiword sequences, they should not be considered as

[^10]inevitably exclusive but rather as complementary, since the three perspectives contribute to a better understanding of the associations established between the different constituents of multiword expressions. As Gledhill (200b) asserts:
> "Despite differences of methods, each approach leads us to reconsider the relationship between words within the collocational expression and to revise the traditional notion of phraseology (...) a lexico-grammatical analysis of a specific discourse can be supplemented by an analysis of phraseology." (Gledhill 2000b: 17)

In general terms, this thesis will use the notion of collocation as a syntagmatic recurrent combination of words. More specifically, following Gledhill's view, the three collocational models presented in this section have been adopted at different stages of the present research. First, from a statistical perspective, the word combinations examined in this corpus-based study have been analysed in terms of their frequency of occurrence. Secondly, from a phraseological approach, the lexico-grammatical patterning characteristic of the abstract nouns considered has been explored in a corpus of medical English ${ }^{18}$. Finally, the role that the use of the analysed expressions play in the construction of phraseology in medical discourse has also been discussed ("rhetorical approach").

The following section addresses the issue of phraseology in language, paying special attention to its treatment in scientific English (2.4.1) and in foreign language learning (2.4.2).

### 2.4 Phraseology in English Research Writing

> "Phraseological analyses demonstrate that much of communication makes use of fixed expressions memorized as formulaic chunks, that language is rich in collocational and colligation restrictions and semantic prosodies, that the phrase is the basic level of language representation where form and

[^11]meaning meet with greatest reliability (...) The phrase is at the centre of language, and thus calls the attention of the broad range of language sciences." (Ellis 2008:6)

As noted by Ellis (2008), phraseology plays an important part in language production. Thus, the description of the characteristics, lexico-grammatical patterning, usage and discourse function of prefabricated expressions has been extensively researched and discussed in the literature over the last decades. Recent phraseological studies ${ }^{19}$, mainly focused on the analysis of academic English, have pointed to the fact that phrases (also referred to as formulaic sequences) are central to the grammar. In this context, phrases are viewed as the main focus of linguistic analysis since they contribute to characterise the language of different discourse communities. In Oakey's (2002) view, a lexical phrase can be defined as:
> "a discontinuous formulaic sequence which has been assigned a pragmatic function, and thus each occurrence of a pattern needs to be examined in context in order to identify the function it appears to have in the text." (Oakey 2002a:116)

According to Singleton (2000), several linguistic schools such as LexicalFunctional Linguistics, Construction Grammar, Valency Grammar and the various forms of Dependency Grammar have enormously contributed to placing the study of the lexicon at the forefront of much linguistic research being conducted nowadays. Within this lexical perspective, it is argued that there is a continuum between lexis and grammar and, therefore, lexical items are described in terms of the constructions they take part in:
"Not only do constructionists see as a continuum the properties of syntactic, phraseological and lexical structures, but they also are convinced that phraseological patterns make up the vast majority of structures that enter into everyday discourse." (Fillmore 1989:34)

[^12]Phraseological studies have greatly benefited from all the above linguistic theories which have promoted the study of meaning across different patterns of language. This attested interaction between meaning and form has already been discussed (cf. section 2.2), but it seems worth noting that this symbiotic relationship becomes particularly apparent in the analysis of lexical phrases. Nattinger and DeCarrico (1989) comment that:

> "multi-word lexical phenomena (...) exist somewhere between the traditional poles of lexicon and syntax. They are similar to lexicon in being treated as a unit, yet most of them consist of more than one word, and many of them can at the same time be derived from the regular rules of syntax, just like other sentences." (Nattinger \& DeCarrico 1989:118)

Likewise, the advent of corpus linguistics has also been fundamental in the development of empirical studies of phraseology, since it has given the computational means by which automatic analyses of large bodies of naturallyoccurring data can be carried out (Kjellmer 1984/1990; Sinclair 1987b/1991). The close observation of real language in context has confirmed the fact that "natural language makes considerable use of recurrent patterns of words and constructions" (Ellis 2008:4), so the lexical context is considered to provide the linguist with an invaluable wealth of information regarding meaning and grammatical function.

Consequently, the potential of corpus research should not be underestimated in phraseological studies because it constitutes a step further in the methodology employed in linguistic description and "leads to a deeper understanding of the obligatory nature of much that is written in academic discourse." (Gledhill 2000a:133).

According to Krishnamurthy (2000), traditional grammar used to rely mostly on native speakers' intuitions with respect to word combinations:

> "These [native speakers' intuitions] were often incorrect, or at least inexact, because each of us has only a partial knowledge of the language, we have prejudices and preferences, our memory is weak, our imagination is powerful (so we can conceive of possible contexts for the most implausible utterances), and we tend to notice unusual words or structures but often overlook ordinary ones." (Krishnamurthy 2000:32-33)

In contrast, corpus linguistics is based on the actual use of such combinations in real language as being produced by speakers, which, in Oakey's (2000) words, certainly entails "a clearer, less intuitive insight into these units, and illuminate how their form and use differs in different academic contexts." (Oakey 2002a:111).

Another area which is receiving phraseologists' attention (Glaser 1988; Cowie 1988; Howarth 1996; Partington 1998; Wray 1999; Gledhill 2000b; Hyland 2008; Granger \& Meunier 2008) is the key role of multiword expressions in the textual development of meaning. Present-day phraseological studies are concerned not only with the lexico-grammatical analysis of formulaic sequences of specific discourses, but also with their rhetorical uses (Gledhill 2000b:17) since, as will be further discussed in subsection 2.4.1, lexical phrases fulfil varied discourse signalling and cohesive functions across disciplines (Oakey 2002a:111). The following assertions traced in the literature will serve to illustrate this point:
"[Multi-word expressions] are extended collocations which appear more frequently than expected by chance, helping to shape meanings in specific contexts and contributing to our sense of coherence in a text (...) [They] are not only central to the creation of academic discourse, but (...) they offer an important means of differentiating written texts by discipline." (Hyland 2008:4)
"The notion of phraseology implies much more than inventories of idioms and systems of lexical patterns. Phraseology is a dimension of language use in which patterns

> of wording (lexico-grammatical patterns) encode semantic views of the world, and at a higher level idioms and lexical phrases have rhetorical and textual roles within a specific discourse. Phraseology is at once a pragmatic dimension of linguistic analysis, and a system of organisation which encompasses more local lexical relationships, namely collocation and the lexico-grammar." (Gledhill 2000b:202)

All in all, research on the field of phraseology seems to indicate that mastering formulaic constructions is a significant factor in successful linguistic production. In that same line, this thesis stresses the importance of gaining control of the phraseology characteristic of medical English so as to show linguistic competence. As will be further discussed, this is especially relevant for the medical community as they are committed to disseminate their research internationally (Flowerdew 2007) and, thus, must be familiar with the phraseological conventions of the discourse community they are part of.

### 2.4.1 Phraseology in specialised registers

"[T]he picture we have of the research article is far from complete. That picture suggests that there are certain characteristics of RAs [research articles] which, by and large, tend to occur and recur in samples drawn from an extensive range of disciplines (...) However, it remains the case that RAs [research articles] are rarely simple narratives of investigations. Instead, they are complexly distanced reconstructions of research activities, at least part of this reconstructive process deriving from a need to anticipate and discountenance negative reactions to the knowledge claims being made." (Swales 1990:174-175)

Swales' account of the genre of the scientific article points to the existence of a number of conventions which contribute to define and characterise the scientific discourse. Textual analyses of the genre are hence extremely important so as to identify the phraseological structures characteristic of scientific English.

Genre analysis is concerned with a particular subset of language; that is, a specific language practice, characterised by a number of linguistic features and phraseological conventions. It can be therefore claimed that genres make use of different ways of expressing meaning (Hunston 2002:178). This assumption is intimately linked with the concept of local grammar (Gross 1993; Barnbrook \& Sinclair 1995; Hunston \& Sinclair 2000), which consists of a description of particular areas of language (e.g. the analysis of the phraseology characteristic of medical discourse), rather than the language as a whole (Bednarek 2007).

The current treatment of phraseology in specialised registers acknowledges the need for corpus-based studies of the prototypical lexico-grammatical patternings and discourse functions of lexical phrases across disciplines (cf. Carter 1998; Oakey 2002a/b; Hyland 2008) ${ }^{20}$. According to Hyland (2008),

> "Gaining control of a new language or register requires a sensitivity to expert users' preferences for certain sequences of words over others that might seem equally possible." (Hyland 2008:5)

Thus, it seems that getting familiar with the specific phraseology of the register of a discourse community will imply not only a better knowledge of the genre but also an enhanced competence in the process of writing and reading in specialised registers. As Williams (2002) claims:
> "In order to understand texts, we must look at them closely to find the lexico-grammatical strategies that they adopt to assist communication within a specialised community." (Williams 2002:60)

Studies in genre analysis, such as Swales' (1990) investigation of academic and research settings; Bhatia's (1993) exploration of genre in professional contexts and Gledhill's (2000b) work on collocations in science writing, suggest

[^13]that there are significant textual variations in different specific-domains and genres ${ }^{21}$. These findings have underlined the convenience of analysing specialist corpora so as to find out the "kinds of language data which particular communities of users might encounter and which will inform their use." (Hyland 2008:8).

As already stated, close observations of real language in use by means of corpus-based data constitute a useful method for the textual and rhetorical study of phraseological units on the one hand, and for the study of how those expressions serve to characterise the discourse within which they have been produced, on the other.

Despite the abovementioned growing interest in the formulaic aspects of language knowledge in specialised registers, Gledhill (2000b) observes that in comparison with linguistic analyses based on general English corpora, less work has been conducted on specialised language to date. More specifically, he claims that there is a noticeable shortage of linguistic corpus-based studies in the field of phraseology in scientific discourse.

There are, however, some remarkable exceptions. Several worth mentioning studies focusing on scientific articles as a whole are, for example, Myers' (1989) account of the pragmatics of politeness involved in scientific papers; Master's ${ }^{22}$ (1991) study of active verbs with inanimate subjects in scientific English and Banks' (1994) analysis of the organisation of different clause types in the scientific journal article.

Other studies on the phraseology characteristic of scientific discourse, on the contrary, have centred their investigation either on a specific domain within the field of scientific English or, to a lesser extent, on the different (sub)sections of the scientific article. Examples of the former can be traced in the following

[^14]literature that explores the textual properties of health science (i.e. medical and biological) discourse:
a) Adams' analysis of authorial comments (1984) and variation (1987) in medical English.
b) Malcolm's (1987) study of the rules governing tense usage in medicine.
c) West's (1980) exploration of "that-clauses" in biological science.
d) Thomas' \& Hawes' (1994) classification of a list of reporting verbs (e.g. demonstrate, indicate, show, suggest) in eleven medical journals.
e) Salager-Meyer's (1994) study of hedging in medical discourse.
f) Gledhill's (1995/1996) phraseological analysis of cancer research articles.
g) Williams' (1996) work on lexical verbs in clinical and experimental research reports.

With respect to research on, more specifically, the different (sub)sections of the scientific article, Salager-Meyer's (1992) exploration of medical English abstracts (with a special emphasis on verb tense and distribution of modality) and Gledhill's (2000a/b) work on the rhetorical function of collocation in research article introductions are also remarkable examples.

All the above literature has proven extremely useful in the characterisation of science writing, and has also confirmed Swales' (1990) assertion of the complexity of the scientific research article: "the RA [research article] is anything but a simple genre" (Swales 1990:128). Several textual properties of the scientific discourse such as modality (Huddleston 1971; Widdowson 1979; Adams-Smith 1984; Salager-Meyer 1992; Banks 1994; Gledhill 2000a/b), hedging (Myers 1989; Swales 1990; Salager-Meyer 1994; Banks 1994; Varttala 1999; Gledhill 2000), the use of the passive and the anticipatory it-pattern so as to disguise authorial interpretations (Huddleston 1971; Swales 1990; Banks 1994; Biber et al. 1998/1999; Hyland 2008), an attested tendency to use grammatical metaphor (Salager-Meyer 1992; Banks 1994; Halliday 1998; Gledhill 2000a/b) and a high use of abstract nouns in the expression of processes and methods (Halliday 1993; Flowerdew 2003) have been identified
as defining rhetorical devices which contribute to a great extent to the development of scientific discourse (Luzón 2000; Gledhill 2000b; Noguchi 2006; Hyland 2008).

If, as already discussed in the reported literature, much of the language involved in scientific discourse is "highly stereotypical in nature" (Gledhill 2000a:116), it seems of paramount importance that members of that discourse community become familiar with the collocational expressions considered to be "good scientific style":

> "collocations in science writing are undoubtedly selected as the best ways of expressing certain ideas $(\ldots)[T]$ he selection is largely a feature of convention and acceptability within the discourse community." (Gledhill 2000a:133)

In Gledhill's (2000a) view, conforming to those conventions will provide scientists with the phraseological competence necessary for effective and accurate communication. Following Gledhill (2000), this dissertation focuses on the linguistic problems Spanish doctors encounter when writing their research articles in English. Bearing in mind that they are expected to spread their results around the medical community, the present research will highlight the fact that non-native writers are faced with the further challenge of producing native-like publications for international journals.

The difficulties that mastering the formulaic patterns of specialised registers may pose for non-native speakers as well as the role of phraseology in English as a Second Language (ESL) and English as a Foreign Language (EFL) Writing for Specific Purposes will now be examined in the light of the reviewed literature.

### 2.4.2 Phraseology in Foreign Language Learning


#### Abstract

"The notion that native-like proficiency in a language depends crucially on a stock of prefabricated units -or 'prefabs'- varying in complexity and internal stability is now set in critical opposition to the atomistic view, rooted in generative theory, that the workings of a language can be explained by a system of rules of general applicability, a lexicon largely made up of minimal units and a set of basic principles of semantic interpretation." (Cowie 1998:1-2)


As Cowie (1998) points out, the role of prefabricated expressions as a significant indicator of communicative excellence in a language is now acquiring increasing relevance in phraseological studies. Although the existence of fixed forms in language had long been observed (Bloomfield 1933; Firth 1957), it is with modern linguistic theories (in particular, with the neo-Firthian's pioneering work of, for instance, Halliday and Sinclair) that the issue of formulaicity in language has been brought to the fore of current linguistic discussion.

After the predominance of the Chomskyan generative model to language, more recent linguistic approaches such as Cognitive Grammar (Langacker 1991/2000; Croft \& Cruise 2004), Construction Grammar (Fillmore, Kay \& O'Connor 1988), Lexical-Functional Grammar (Bresnan 1982), Valency Grammar (Allerton 1982) and the various forms of Dependency Grammar, and Pattern Grammar (Hunston \& Francis 2000) have emphasised the mutual dependence between the lexicon and syntax and have addressed the issue of the pervasiveness of phraseology in language:
"[l]f lexicon comprises the fixed expressions of a language, it subsumes not only single morphemes and polymorphemic stems and words, but also thousands of multiword conventional expressions (clichés, idioms, standard collocations, etc.) representing usual ways of expressing oneself in a language." (Langacker 1991:3)

Recent corpus-based studies of multiword expressions (Sinclair 1991; Gledhill 2000; Oakey 2002a/b; Stubbs 2001; Nesselhauf 2005; Hyland 2008; Granger \& Meunier 2008) have confirmed that discourse communities tend to make use of recurrent word combinations and prefabs. As pointed out in subsection 2.4.1, effective communication in a language is highly dependent on the user's knowledge of the expected fixed expressions in a given context. In other words, lexical phrases are regarded as the means by which speakers are able to process language effectively and improve fluidity when encoding messages (Wray 2002). This, inevitably, holds a number of implications since non-native speakers must conform to the conventions of native-like discourse, which entails, as has been observed, not only selecting the right lexical items, but also full communicative mastery of the lexico-grammatical patterns and discourse functions of prototypical collocations (Howarth 1998a:186).

As research on non-native speakers' phraseological competence has demonstrated, the processing and use of phraseology pose many difficulties for learners (Carter 1998; Howarth 1996/1998; Wray 1999; Oakey 2002a/b; Williams 2005; Nesselhauf 2005; Ellis 2007; Hyland 2008; Granger \& Meunier 2008; Paquot 2008, among others):

> "knowing which subset of grammatically possible utterances is actually commonly used by native speakers is an immense problem for even the most proficient of non-natives." (Wray $1999: 468$ )

According to Howarth (1996), non-native speakers' lack of phraseological competence is partly due to the fact that they are not taught collocations explicitly. As he comments:
"few learners are taught collocations and they are perhaps unaware of the collocations that they do know and have acquired accidentally. The evidence from their errors in producing overlapping collocations suggests that their competence is full of gaps and highly variable between
learners and that this is a particularly unstable area of interlanguage." (Howarth 1996: 192)

Howarth (1996) thus claims that the field of phraseology should play a predominant role in foreign language instruction as empirical studies have revealed that deviations occurring in collocations are particularly frequent in non-native speakers' oral and written production (Howarth 1996/1998; Granger 1998; Wray 1999/2002; Altenberg \& Granger 2001; Nesselhauf 2005):


#### Abstract

"The problems for learners are, firstly, to recognize that the phenomenon of conventionally restricted collocability exists and is widespread and, secondly, to acquire knowledge of the particular facts of how the phenomenon is realized in practice." (Howarth 1996:136)


and then
"many learners fail to understand the existence of the central area of the phraseological spectrum between free combinations and idioms. It is in handling restricted collocations that errors of both a lexical and grammatical nature constantly occur." (Howarth 1998a:186)

As can be inferred from Howarth's (1996/1998) assertions, it is also of vital importance to draw learners' attention to the phenomenon of phraseology in language and raise their awareness of the collocations and prefabricated expressions which are characteristic of native linguistic production.

Research into pedagogical tools and materials that help learners of English as a Foreign Language (EFL) to improve their phraseological competence is also beginning (Granger 1998; Walker 2008; Gouverneur 2008; Pecman 2008). Walker (2008) stresses the need to design teaching materials that lay greater emphasis on collocations, understood as motivated and, therefore, susceptible to be explained, word strings. He argues that the right approach to the teaching of collocation should challenge learners to reflect on why some words are often
associated with some others, so as to make their collocational learning process more meaningful. As he claims:
"There needs to be a movement away from the current emphasis on techniques for the rote memorisation of lists of collocations. Instead, teaching material needs to contain exercises which focus upon one aspect of collocation, such as the semantics of individual items or the use of metaphor (...) Once collocations become items which can be explained, they are immediately more meaningful to the learner and therefore more memorable (...) With the right kind of materials and the right approach to the teaching of collocation, the whole process of learning collocations should become more meaningful for the learner, as well as more enjoyable." (Walker 2008: 307)

However, phraseologists (Cowie 1992/1998; Howarth 1996; Granger 1998; Kaszubski 1998; Wray 2002; Nesselhauf \& Tschichold 2002; Schmitt 2004; Walker 2008) are also aware of the fact that more empirical analyses studies on lexical phrases are needed. As Granger states:
"prefabs certainly need to play a greater role in EFL than they have in the past (...) [L]earners' phraseological skills are severely limited: they use too few native-like prefabs and too many foreign-sounding ones. But if we are to devise the 'ideal' pedagogical tools, a great deal of more empirical data on prefabs is required." (Granger 1998:158)

Another important issue in the creation of useful tools aimed at improving nonnative speakers' control of phraseology is, as suggested by Granger (1998), the need for an in-depth analysis of the phraseology of the learners' mother tongue. To this respect, she claims that further research on the phraseology characteristic of the non-native speakers' L1 would be desirable because transfer of structures from their mother tongue has been found to affect L2
phraseology (Gabrys-Biskup 1992; Bahns \& Eldaw 1993; Kellerman 1995; Granger 1998; Ellis 2007; Paquot 2008):

> "L1 plays an important role in the acquisition and use of prefabs in the L2. For obvious commercial reasons, most EFL material is aimed at all learners, irrespective of their mother tongue. Given the essentially language-specific nature of prefabs, this is a major issue that must be addressed if we are serious about giving learners the most effective learning aids." (Granger 1998: 159)

Regarding L1 influence in the learners' phrasicon, Gabrys-Biskup's (1992) and Bahns' \& Eldaw's (1993) analyses of L1 transfer and its various implications in L2 phraseology are also worth recalling. Gabrys-Biskup (1992) examines deeply the influence of L1 in translations produced by Polish and German learners of English. In particular, this study focuses upon the strategies employed by learners when translating L1 word combinations into English. Similarly, Bahns \& Eldaw (1993) investigate the mechanisms used by German subjects in translating a text into English. The results of both investigations show that non-native speakers lack knowledge of English collocations.

Other collocational studies in learner language stress non-native speakers' misuse of native-like word combinations. Granger's (1998) analysis of the production of adverb-adjective constructions shows that learners make less use of prefabricated expressions in comparison with native speakers. In the same line, Howarth (1996) and Kaszubski (2000) explore the use of verb-noun combinations by non-native speakers. The former compares English verb-noun combinations produced by speakers of different mother tongues against native verb-noun associations. Howarth's findings suggest that non-native speakers tend to use fewer collocations and that their level of proficiency, contrary to Zhang's (1993) observations, does not seem to have any remarkable influence in their phraseological competence. Likewise, Kaszubski's (2000) comparison of the collocational uses of five supporting verbs (i.e. do, get, have, make and
take) both in native and non-native corpora yields similar results concerning the limited number of collocations used by non-native speakers.

Nesselhauf's (2005) work on non-native speakers' production of multiword units also constitutes a thorough investigation of the difficulties German learners face when producing verb-noun combinations. Her data reveal that the collocations provided by advanced learners of English show a high degree of deviation and, therefore, her study corroborates Howarth's (1996) conclusion that non-native speakers' advanced level of English does not have any remarkable positive effect on their collocational competence.

As observed in the reviewed literature, the influence of learners' L1 as well as the problems that the use of multiword units pose for non-native speakers is gaining considerable attention in the field of EFL learning and teaching. There is now growing evidence that phraseological units should be acknowledged as a particularly interesting research area, not only for linguistic description, but also for foreign language instruction (Nuccorini 2002; Granger \& Meunier 2008).

All in all, numerous empirical studies of L2 phraseology, based on learners written production (Gabrys-Biskup 1992; Bahns \& Eldaw 1993; Howarth 1996; Granger 1998; Kaszubski 2000), have evidenced that non-native speakers lack awareness of the most typical collocations in English, both in the general language and specialised registers. As the processing and production of such prefabricated units have proven particularly problematic for learners, a phraseologically-oriented approach to FL instruction seems to be justified (Cowie 1998; Lewis 2000; Oakey 2002b; Ellis 2008). As Cowie (1998) observes:
"[S]ensitizing advanced learners to the crucial importance of this central area of the phraseological spectrum must be a major priority of EFL teachers." (Cowie 1998:15)

This priority and the pervasive role of phraseological units in language are, as already noted, at the centre of much of the current work devoted to phraseology
in foreign language learning and teaching. In this dissertation the important role played by phraseological units in foreign language learning as well as the difficulties non-native speakers are confronted with in writing their medical articles in English will also be explored. In the next chapter, the methodology used in the research study will be presented.

## CHAPTER 3: METHODOLOGY

The following chapter describes in detail the methodological issues considered in the present study. In section 3.1 the notion of corpus linguistics as a methodology as well as the criteria followed for applying a corpus-based approach to this research are examined. Section 3.2 gives account of the construction and processing of the corpus compiled in this investigation and section 3.3 presents the survey conducted among a community of twenty-four Spanish doctors whose profile will be outlined in section 3.4. Following the characterisation of the participants in the sample, section 3.5 will provide a detailed description of the worksheet of exercises administered among them. The final section of this chapter (3.6) will serve as a summary of the methodology applied.

### 3.1 Corpus linguistics as a methodology. The rationale for using a corpusbased approach


#### Abstract

"Neither the corpus linguists of the 1950s, who rejected intuition, nor the general linguists of the 1960s, who rejected corpus data, was able to achieve the interaction of data coverage and the insight that characterise the many successful corpus analyses of recent years." (Leech 1991:14)


This section is devoted to the role of corpus linguistics as a methodology in linguistic research. Nowadays corpus methodology enjoys widespread recognition. As many scholars (Leech 1992; Hunston \& Francis 2000; TogniniBonelli 2001; Meyer 2002; McEnery et al. 2006; Moon 2007) have already pointed out, corpus linguistics should be regarded as a system of methods applied to the analysis of real language data, "a methodological basis for pursuing linguistic research" (Leech 1992:105), rather than a theory of language of its own: "corpus linguistics provides a methodology, not an end or theory in itself' (Moon 2007b:1058). According to McEnery et al. (2006), corpus linguistics does have a theoretical basis but it is not a linguistic theory as such: "as (...) a system of methods and principles of how to apply corpora in language
studies and teaching/learning, [corpus linguistics] certainly has a theoretical status. Yet theoretical status is not theory itself' (McEnery et al. 2006:7-8).

In line with Meyer's (2002) and McEnery et al.'s (2006) statement, I understand corpus linguistics as a methodology on its own rather than as an independent linguistic theory. Unlike some other branches of linguistics such as lexicology, morphology and semantics, corpus linguistics is not merely limited to the analysis of a single aspect of language. Quite on the contrary, it can be applied to the study of many linguistic areas.

The work presented in this thesis follows thus the corpus methodology and highlights how linguistic analyses can greatly benefit from a corpus-based approach ${ }^{23}$. Corpus-based approaches to language studies emphasise how the use of computers to manipulate and analyse large bodies of language data has tremendously affected "the methodological frame of linguistic enquiry". (TogniniBonelli 2001:210). Traditionally, language has been described in language classrooms by means of setting rules and offering examples to reinforce and back up such pre-established rules. As Tognini-Bonelli (2001:17) advocates, set rules hardly reflect real instances of language use. Thus, a new approach that takes into account the close interrelationship between syntax and the lexicon (Hunston \& Sinclair 2000; Hunston \& Francis 2000; Hunston 2002) and provides examples of real language in context seems extremely beneficial for both language teaching and learning.

In this view, I maintain that corpus linguistics as a methodology can help a great deal to compensate the existing mismatch between traditional descriptions and real language instances. As a corpus-based research study, this thesis examines the information drawn from corpus evidence, from which some generalisations regarding the recurrent lexico-grammatical patterning of abstract nouns in the medical academic texts under study will be made.

[^15]It has been long acknowledged (Sinclair 1991; Hunston \& Francis 2000; Gledhill 2000; Verdaguer 2003; among others) that when encoding a message it is necessary not only to use the correct terms and grammatical structures, but also the appropriate lexical combinations and collocations. The same can also be applied to the description and analysis of a given word. As has already been noted, the use of corpora enables both the researcher and the teacher to have access to a large amount of naturally occurring language: language in use. Within this framework, words can be analysed as part of a chain, which allows the direct observation, identification and even generalization of the most frequent collocates of node words. Besides, the analysis of a large body of real language in context also provides useful information with regard to the different grammatical structures and semantic categories in which a given sense might occur.

Having discussed the concept of corpus linguistics as a methodology as well as the rationale of the proposed corpus-based approach for linguistic description and analysis, we now turn to section 3.2 where the compiled corpus is presented.

### 3.2 Corpus data

This section presents the corpus on which this research is based as well as the principles of corpus design adopted in its compilation. Likewise, it explores the software employed in retrieving data from the selected compilation of texts. The main corpus analysed in this study is the Health Science Corpus (HSC), which is a representative sample of texts specifically assembled for the current investigation of the use of abstract nouns by the health science community.

> "[..] corpus analysis presents considerable methodological advantages for a description of languages for specific purposes. In the first instance, the rhetorical aims of the writers are known and can be prioritised in the analysis: this is not an anonymous collection of texts. In addition, we have seen that while there are many studies of phraseology and lexico-grammar in the general
language, few specialist varieties have benefited from a largescale corpus analysis of this kind." (Gledhill 2000:90)

Following Gledhill's view, I strongly believe in the methodological potentiality of corpus analysis for the description of language for specific purposes. Interested as we were and still are in the lexico-grammatical patterns of non-technical terms in scientific English and the conventionalized phraseological characteristics of that genre, and bearing in mind that there was no corpus of scientific English publicly available ${ }^{24}$, our research group ${ }^{25}$ decided to compile our own micro-corpus, now consisting of approximately 4 million words (see Figure 1 below) of scientific research articles from prestige online journals ${ }^{26}$ that cover different disciplines such as medicine, biology, biochemistry and biomedicine. ${ }^{27}$

[^16]

Figure 1 WordList of the HSC provided by WordSmith Tools ${ }^{28}$
Taking into account the fact that all the disciplines it embraces fall into the category of health sciences, it came to be called the Health Science Corpus (HSC). As will be seen, the HSC comprises a collection of written material produced by native speakers of English put together according to a common corpus design. It is thus necessary at this stage to set out the criteria followed in its building up. Gries \& Stefanowitsch (2006:4) propose some principles of corpus design which were adopted in the compilation of the HSC:
a) The present study is based on naturally-occurring language in machinereadable form.
b) The retrieval of search patterns was made by means of linguistic software tools.
c) The HSC is intended to be a representative sample of the research article in the health science register this research is focused on.

[^17]d) The whole collection of running text (rather than a random selection of examples) was considered.
e) The linguistic analysis undertaken, which will be thoroughly described in section 4.1, proceeds on the basis of frequency lists of the abstract nouns under study, concordance lines that display those nouns in their natural context of appearance, and collocations: that is, the actual words that co-occur with the nouns of interest to the study.

Once the corpus was compiled, all scientific articles, a total of 718 , were fully edited to smooth out problems concerning the typographical form of texts. Every downloaded text presented problems with capital letters, paragraphing, diagrams, numbers, photographs, columnar layouts, etc. Thus, they were edited manually, which took us a great deal of time and effort, converted into plain text files and then stored into different folders and subfolders. All these steps were prior to the data processing stage.

Computerised corpora and linguistic software tools are essential for linguistic data management. The processing of a corpus by means of computerised methods has proven to be a very useful tool for the researcher to process in real time large quantities of texts, which had been otherwise completely impossible. There are several software programmes at the lexicographer's disposal to store a corpus electronically. The software used in retrieving data from the HSC and refining the results further was version 3.0 of the concordancing program WordSmith Tools ${ }^{29}$. This program provided us with a list of words, which allowed us to find out what general terms are most frequently used in scientific English. Taking such a list as the starting point, I selected five abstract nouns, based on frequency counts, for the present study.

WordSmith software also supplied a list of concordance lines of the chosen words that made it possible to identify the patterns of word co-occurrence and their frequency of appearance. As Figure 2 shows below, this software displays

[^18]
# $K W I C^{30}$ concordance lines within a collocation span of 5 words to the left and 5 words to the right. As Clear (1987:41) observes, the value of the information provided by this tool should not be underestimated since it saves the researcher a great deal of time and brings out in a few seconds patterns of word cooccurrence that could have easily passed unnoticed. Such a tool also enables to have a quick access to the source text each line comes from by right clicking on "View Text" (cf. Figure 3). 


#### Abstract

 - 日 $\square=\boldsymbol{*}$ Phillips, J., and L. Lanier (1986) Dissection of the lymphokine-activated killer phenomenon. Relative contribution of peripheral blood natural killer cells and T lymphocytes to cytolysis. J. Exp. Mel le 1 that the 4710 (u f0.32) additional transcripts of abundance class $D$ make the largest and decisive contribution to the colon-cancer phenotype. The value of $p$ fl2.5 for the decisive abundance class $D$ of the ross colinear and rearranged chromosomes provides a simple but direct method for estimating the relative contributions of chromosomal rearrangements and genic factors to genetic isolation. Although our data the disproportionate representations of some subjects in the analyses. To minimize the impact of unequal contributions, we limited the number of calls by any animal included in the analysis to 10 per session. $E$ e ability to disrupt genes in the mouse germline provides an opportunity to develop models and to test the contributions of specific genes to neurobiological processes. The information obtained from these studie: parison revealed differences between 170018 and PA01. Posttranslational modification was explored for its contribution to the observed differences in molecular weight among the a-type strains. A biotin-hydrazide frmation and lesional complications. We aimed to identify possible molecular effectors of C . pneumoniae contribution to atheroma. HSPs have been implicated as antigens stimulating autoimmunity in atherog ice developed abnormal blood vessels, with the latter displaying a more severe phenotype. The exclusive contribution of ES cells to primitive ectoderm derivatives, such as embryo proper, amnion, and yolk sac vith beneficial mutations studied here depends only on the relative change in mutation rate, and hence its contribution to $\mathrm{d} \ln$ W/dU becomes asymptotically more important as U approaches zero. The number C rather indifferent to the nature of the amino acid side chains in the 5 strand, though not of course to their contribution to the correct protein fold [in accordance with other evidence coming from a study of the ir ngutans and mandrills. It is important to note that these multivitamins did not appear to provide significant contributions to the parameters tested, and in fact most of the animals supplemented did not have any $n$ colleagues(33) have found that certain oxidative damage is repaired by nucleotide excision repair, but the contribution of these pathways to overall oxidative damage repair remains uncertain. Protection against dressing this question. Its microbial contents provide a numerically and physiologically important cellular contribution to the host. The human body is estimated to contain 1014 cells, $10 \%$ of which belong to the a fraction are shown. The largest fraction of affected sites is found in the first part of the gene. The largest contribution of CpG sites in mutations at $G: C$ base pairs is in the first 400 base pairs of the gene. The df at five of seven $(71 \%)$ patients had either no thymus or no areas of thymopoiesis, demonstrating that no contribution to the peripheral $T$-cell pool was being made by the thymus in those subjects at the time of el. The residual signal represented release of NO from the S-NO bond of SNO-hemoglobin, with possible contribution from the nitrosyl(heme)hemoglobin. The concentration of NO released in nM is subtracted fi gh donation of a hydrogen bond to the phosphate might reduce the pKa of the substrate phosphate, the contribution of neighbouring charged groups are likely to influence the pKa more strongly. Glub72 is just ly how Bcd works as an activator, we systematically analysed these three functions of Bcd to access their contributions to gene activation. By taking advantage of Abbreviations used: Bcd, Bicoid; hb, huncht AA has not been mentioned. The amount of mtDNA is so small relative to the DNA of the nucleus that its contribution to the total is negligible. However, as the site of respiration, mitochondria must have a partic ne mass $(10,11)$ late in life. Thus, a comprehensive description of pathogenesis should encompass the contributions of both low peak bone mass and rapid bone loss, and should recognize that for a given pa s that have given rise to the same or a larger number in the present, each of the different combinations of contributions of ancestral to present day lineages is equally likely. This means that if there were just twc ay contribute to the reduced blood pressure seen in these animals while they are on a normal diet. The contribution of PG s to many important biologic processes has been recognized for years. Recently, mic ay contribute to the reduced blood pressure seen in these animals while they are on a normal diet. The contribution of PGs to many important biologic processes has been recognized for years. Recently, mic of fiber. Even though nearly $80 \%$ of the plant cell wall is lost in fecal material, one should not overlook the contributions of this indigestible fraction of the diet. Often considered a "negative feed factor," the benefic se against invasion by exogenous, pathogenic organisms or indigenous opportunists. 2 These physiologic contributions are reciprocated by the provision of stable niches in the intestine for the microorganisms, $n$ 11. Rosenow, C. P. Ryan, J.N. Weiser, S. Johnson, P. Fontan, A. Ortquist, and H.R. Masure (1997) Contribution of novel choline-binding proteins to adherence, colonization and immunogenicity of Stre calcium in the negative regulation of MT1-MMP activity (Fig. 4).(61) Other MT-MMP members Potential contributions of other MT-MMP members to cancer progression are not well characterized. Like MT1-MI of HIV-1 infection and response to HAART in thymectomized individuals. Our study argues for minimal contributions of the thymus to maintenance or reconstitution of the peripheral pool of $T$ cells in the adult erved feeding time). Based on the nutrient composition of different plant parts, weighted by the percentage contribution (feeding time assumed equivalent to mass of forage intake) of each part, no difference was tribute to neutrophil recruitment, lung injury, and respiratory impairment during PCP. To better define the contribution of CD4 + and CD8 + cells to the immune-mediated pulmonary injury observed as the host re: oped their passion for birds. I was also impressed that in several places Barrow specifically discussed the contributions of women to the field of onnithology. Although A Passion for Birds never answers the questi sms may be involved in the propagation of inductive and patterning signals. Planar signaling In frogs, the contribution of planar signaling to the induction and patteming of the nervous system has been mostly s locks are so large within the rearranged linkage groups that it was not possible to distinguish between the contributions of chromosomal and genic factors for these blocks. Of the 21 fertility blocks, 14 were as: $-122 \mathrm{~mol} / \mathrm{min} / \mathrm{g}$ wet weight ( n f10) but in the presence of cells it was not possible to determine the relative contribution of this glucose derived directly from fructose or from endogenous substrates. The overall effe be higher than that recorded but the effect of mycopathogens on the preemergent adult population and its contribution to the overall regulation of thrips numbers is unknown. Lastly, many soils, soil organisms, a 3380447 Biochem. J. (1999) $338,447 \pm 455$ (Printed in Great Britain) 447 Contributions to gene activation by multiple functions of Bicoid Xiuguang MA* $<1$, Dong YUAN* $<2$ d like cellular jigsaw puzzles, each cell of which was prespecified to produce its own precisely delimited contribution to the mosaic that was the developing organism. Other scientists soon performed similar e mate Center, selected plant materials may have contributed little to overall protein nutrition owing to heavy contribution from the commercial biscuits. Nonetheless, the overall diet consumed by lemurs tended to C infused into other species in vivo or into animal tissues ex vivo provided meaningful information on the contributions of hypoxia and of different SS RBC subpopulations to sickle blood flow (11, 12). In particul into glucose by hepatocytes does contribute to a fall in the specific radioactivity of glucose. However, the contribution of this process is small in comparison with the recycling of glucose through the glucose/ glt n (11). In addition, adenosine inhibits cholinergic signal transduction in rat sympathetic ganglia (12). The contribution of these direct or local prejunctional and indirect or reflex neural actions to short-term cardic cipally responsible for secreting these catecholamines, whereas high ratios would indicate a sympathetic contribution. A similar approach of analyzing the ratio of epinephrine to norepinephrine by mammalian s pressure homeostasis and many aspects of female reproduction may be regulated by PGs, the precise contribution of the individual receptors that mediate the actions of PGE2 remains to be defined. Utilizing intake and body weight are determined by a complex interaction of regulatory pathways. To elucidate the contribution of the endogenous peptide cholecystokinin, mice lacking functional cholecystokinin-A rece cells that actually commit to IL-4 transcription early after stimulation remains unknown, but could reflect contributions by very few cells. Earlier studies demonstrated a higher L. major-specific precursor frequei ted in a given protein preparation. Fig. 4. Residue function, secondary structure and contributions to the dimer interface mapped onto the iNOS sequence. The murine dition to the localization of Kar9p. However, if Bni1p does have a secondary role independent of Kar9p, its contribution to nuclear migration must be relatively minor. Otherwise, the additive effects of the two ind 1 plants andor soil ingestion may have been sources of Na for lemurs at SCI with a possible substantial contribution from the provisioned diet Trace mineral concentrations in native vegetation appeared adecur also be interpreted as feeding young [Kleiman \& Malcolm, 1981]. Food transfers seem to be an important contribution to the total food obtained by young beyond weaning age: free-living tamarins receive betweel AND D.G. BLACKBURN ies of anuran forelimb musculature have potential to shed light on the differential contributions of activational and organizational effects of androgens to intersexual differences that vary c acrificed and their lungs were analyzed for evidence of inflammation. In this short-term transfer model, the contributions to the inflammatory process from specific antibodies or host $T$ cells were expected to be -


Figure 2 Concordance lines for the node word contribution provided by WordSmith Tools

[^19]

Figure 3 Source text of a concordance line of the node word contribution displayed by WordSmith Tools

Among the various tools available, it should be mentioned the fact that concordance lines can be sorted, edited, exported, saved as plain text format and printed:
"The fact that the concordance will be read vertically, looking for the patterns of word co-selection entertained by the node with its context, shifts the focus from a model which is primarily paradigmatic and emphasises the freedom of choice to one where the syntagmatic units established in the
light of repetition on the vertical axis of the concordance take precedence." (Tognini-Bonelli 2001:18)

Furthermore, this software was extremely useful not only to identify collocates and their frequency, but also to classify such collocates in terms of grammatical position, word class, semantic category, etc., to analyse word clusters so as to see the patterns of repeated phraseology in the concordance lines analysed and to make generalisations from the observation of repeated language events. The following figures show illustrative screenshots of these already mentioned tools:


Figure 4 Clusters of the node word agreement as displayed by WordSmith Tools


Figure 5 Collocates of the node word comparison*

When dealing with the data extracted from the worksheet of exercises (section 5.1) and comparing them against the HSC, some methodological decisions were taken. Due to the fact that in some cases ${ }^{31}$ very modest conclusions could be drawn from comparing the HSC and the informants' data, I decided to use the British National Corpus $(B N C)^{32}$ as a third comparison measure. Being a 100 million word collection of samples of written and spoken general language from a wide range of sources, the BNC provided a higher context of cooccurrence and enabled me, whenever needed, to supplement my selected sample of contemporary medical texts. Some word combinations produced by non-native speakers in the worksheet of exercises were also compared against

[^20]the Birmingham's Bank of English (BoE), currently a 450 million word corpus of present-day English.

It should also be stressed that while this analysis is based on a large dataset, my study is still more qualitative in nature than quantitative. It was never the main aim of my investigation to present a purely quantitative account of the use of abstract nouns in both the HSC (cf. sections 4.3-4.7) and the informants' production (cf. section 5.1), but instead to focus mainly on their similarities and differences of use from a more qualitative perspective.

As pointed out above that one of the main aims when compiling the HSC was trying to make a representative selection of naturally-occurring language in a very specific type of genre, the health science discourse, so as to analyse the collocations and syntagmatic structures associated with abstract nouns in that particular register. To this respect, it seems worth-recalling the notion of "local grammar" (Barnbrook \& Sinclair 1995; Hunston \& Sinclair 2000; Hunston 2002), which refers to descriptions of particular areas of language (rather than the language as a whole): "the connection between pattern and meaning opens the possibility of quantifying ways of expressing meanings in different registers via the concept of local grammar." (Hunston 2002:178).

The compilation of the HSC thus understood as "an authoritative body of linguistic evidence which can support generalizations and against which hypotheses can be tested" (Sinclair 1987:2) has facilitated the exploration of the phraseological behaviour of abstract nouns in medical English, with respect to patterning by means of corpus evidence. For many research and pedagogical purposes, I do believe that the larger the corpus is, the more reliable conclusions can be drawn from the careful examination of the language shown. Nevertheless, it must be stressed that I am fully aware of the fact that the HSC constitutes a sample ${ }^{33}$, a cross-section of the health science discourse ${ }^{34}$, so claims will be just based on the results obtained from the in-depth analysis of

[^21]the HSC data. As Partington (1998) observes: "a corpus, no matter how large and varied, is only representative of itself and claims made about the behaviour of linguistic items after studying corpus data should bear this in mind' (Partington 1998:146). Following Partington's consideration, Hunston (2002) notes that all observations made from a particular collection of texts "must be dealt with as deductions rather than as facts". (Hunston 2002:23)

### 3.3 The Survey

This section concerns the data collection method used in this investigation, which consists of a survey conducted among the chosen medical community. A total of twenty-four Spanish doctors from three Spanish hospitals were asked to fill in a survey of ten open questions in which they were required to provide different sorts of information. The main aim of that survey was to gather information on the participants' profile, henceforth referred to as the Survey Profile Questions, as well as to find out their writing process and problem areas when producing their articles in English, henceforth referred to as the Survey Content-Based Questions. The Survey Profile Questions (i.e. informants' personal details along with questions 1-6) contained information about the participants' nationality, their sex and age group, the number of years they had been learning English, whether they ever stayed in an English-speaking country (and, if so, for how long), and how frequent they read and wrote research medical papers in English. The Survey Content-Based Questions (questions 79 ), on the other hand, were concerned with the informants' writing process, the main problems they encountered when writing scientific articles in this foreign language and the tools as well as resources they found to be useful so as to overcome such problem areas. Each survey question will be analysed in detail in sections 3.4 (Survey Profile Questions) and 5.3 (Survey Content-Based Questions).

In the original survey there was also another question (question 10) which attempted to obtain information about the time participants needed to complete the whole questionnaire; that is, not only the time spent in answering the initial
survey but also the worksheet of exercises distributed among them. ${ }^{35}$ The length of the initial questionnaire as well as the workload involved in the completion of the exercises indicated that both activities would take the participants much time. However, in light of their responses ${ }^{36}$, I decided to exclude that question from the data analysis since some informants misunderstood the inquiry as the question itself turned out to be ambiguous. It was placed at the end of the initial questionnaire and some participants thought they were being asked about the time spent in completing the survey (e.g. less than five minutes, between five and ten minutes, fifteen minutes), whereas some other responses seem to include the time devoted to doing the exercises as well (e.g. forty minutes, one hour, two hours). The richness and detailed information of the data drawn from each survey along with the worksheet of exercises, though, undoubtedly indicate that completing the whole questionnaire must have been time-consuming for all informants. In any case, the statistical information in Appendix 2 should not be taken into account due to its unreliability. The full questionnaire is included in Appendix 1.

### 3.4 Informants

A total of twenty-four Spanish doctors constitute the community of informants considered in this research study. As Table 1 shows, each participant in the sample was assigned a code number while analysing their data and, from now onwards, in order to differentiate their opinions they will be referred to by means of that identification number ${ }^{37}$.

| INFORMANTS' WORKPLACE |  |
| :--- | :--- |
| ALB1-ALB3 | Complejo Hospitalario Universitario de Albacete |
| PH1-PH13 | Hospital Universitario Puerta de Hierro |
| HN1-HN8 | Hospital de Navarra |

Table 1 Informants' Identification codes and hospital
Informants belong to a wide range of specialities; most participants from the Complejo Hospitalario Universitario de Albacete (ALB1, ALB2 and ALB3) and

[^22]the Hospital Universitario Puerta de Hierro (PH1-PH13) were working for the Servicio de Endocrinología y Nutrición, whereas the sample from the Hospital de Navarra (HN1-HN8) embraces different departments: "Unidad de Anatomía Patológica" (HN3, HN6), "Unidad de Neurología" (HN1, HN4), "Unidad de Radiología" (HN7), "Medicina Interna" (HN2, HN5) and "Servicio de Oncología" (HN8).

The choice of the abovementioned hospitals was determined by the fact that one endocrinologist from the Hospital Universitario Puerta de Hierro (PH2) and one pathologist from the Hospital de Navarra (HN3) were aware of my research work on phraseology in general and, more specifically, on the syntactic and collocational patterns of non-technical words in scientific English, and had already expressed their interest in collaborating as informants of my research whenever needed. Both doctors put me in contact with the other informants who were either working in the same hospitals as PH2 and HN3, (PH1-PH13) and (HN1-HN8) respectively, or had qualified in the same year as PH2 (ALB1ALB3) but were practising medicine in a different medical centre.

The fact that the candidates were working in so many different places and devoted themselves to several professional activities (i.e. dealing with patients, practising surgery and doing research) made the gathering of the data a timeconsuming process. As already pointed out, it was also really difficult to restrict the sample to doctors from the same hospital and the same research area; so the Survey was extended to also include those doctors, however their speciality, provided by PH2 and HN3 in order to get a broader view of different areas of expertise.

The samples from the Complejo Hospitalario Universitario de Albacete and the Hospital Universitario Puerta de Hierro have proven to be quite homogeneous in terms of their research discipline as most of them work on endocrinology and nutrition. Doctors from the Hospital de Navarra, on the contrary, constitute a more heterogeneous group as far as the main field to which they belong to is concerned, including internal medicine, medical oncology, (neuro)pathology and radiology.

Regardless of their different specialisms, it was likely that I would work with a very similar sample in terms of the age group of our doctors. On the one hand, it was naturally expected that all of them would be older than twenty-five years old since graduates in Medicine are not younger than twenty-four years old. It was also quite likely that most of them would be of similar age as they had qualified in either the same academic year or rather close in time.

It seems important to bear in mind that when finishing their degree in Medicine, or Medicine and Surgery, as it used to be called in Spain not long ago, all doctors-to-be must follow the same path within the Spanish health system. In short, a graduate in Medicine takes, on average, between six months and two years to become a $M I R^{38}$. Depending on their results in the MIR examination, they are allowed to choose the speciality they want and where to practise it. This period tends to last, in broad terms, a minimum of three years and a maximum of five. Then they can be properly referred to as "specialists" and are entitled to work in both private and public health centres. With much effort, time and a "bit of luck" they become what is referred to as "personal estatutario", which in PH2's view means some substantial improvement in a doctor's career. All our informants fitted into the Spanish health system in a similar way:
"con la nota [del MIR] eliges qué especialidad hacer y dónde, según quieras puedes irte al fin del mundo a hacer lo que te gusta o quedarte en donde quieres y hacer lo que quede... dura entre tres (cuatro recientemente) y cinco años, al terminar a la calle con título de especialista, puedes trabajar en la privada o en la pública si te cogen, habitualmente con contratos basura... pasa el tiempo y puedes aprobar una oposición y entonces 'voilà', eres personal 'estatutario' (semejante a funcionario pero no igual). [...] Lo de estudiar en un sitio y formarte en otro es habitual [...] Antes la gente tendía a formarse en los 'mejores sitios' y luego volver a su tierra a trabajar; hoy probablemente es más fácil que te cojan si te conocen,

[^23]es decir, formado en tu tierra." (personal communication with PH2, $08 / 17 / 2007)^{39}$

A Consent form (cf. Appendix 3) was also prepared and distributed among the twenty-four participants in the study so that they could be well-informed of their involvement in this research. In order to avoid possible misunderstandings of their rights and duties as informants, the Consent form was written in their mother tongue (Spanish) and provided them with very detailed information concerning the preservation of their anonymity.

Furthermore, informants were acknowledged of their right to have access to the results obtained from the present study as well as to withdraw from it at any time they wanted or even refuse to answer any question without risk of prejudice. Only data from those informants who signed the Consent form were included in this investigation ${ }^{40}$.

As was stated in section 3.3, part of the data considered in this empirical investigation come from a survey administered to the informant sample, which consists of twenty-four Spanish doctors who were working in three different hospitals when this research was carried out. In the pages to follow, the defining traits of the discourse community under study, based on the information provided by the Survey Profile Questions (questions 1-6), will be carefully analysed.

First of all, participants were asked to fill in some information regarding their sex, age group and contact with the English language. Evidence from the sample reveals that the female participants who provided the data outnumbered

[^24]male ones with 15 to 9 ( $62,5 \%$ as opposed to $37,5 \%$ ). With regard to the age group the informants belonged to, most of them ( $70,8 \%$ ) were between 30 and 40 years old, which makes the sample quite homogeneous as far as the age span is concerned (cf. Figures 6 and 7 below).

SEX

|  |  |  | Valid <br> Percent |  | Cumulative <br> Percent |
| :--- | :--- | ---: | ---: | ---: | ---: |
| Valid | MALE | 9 | 37,5 | 37,5 | 37,5 |
|  | FEMALE | 15 | 62,5 | 62,5 | 100,0 |
|  | Total | 24 | 100,0 | 100,0 |  |



Figure 6 Sex group of the informants
AGE

|  |  | Frequency | Percent | Cumulative percent |
| :---: | :---: | :---: | :---: | :---: |
| Valid | 25-30 | 4 | 16,6 | 16,6 |
|  | 30-40 | 17 | 70,8 | 87,4 |
|  | 40-50 | 2 | 8,3 | 95,7 |
|  | +50 | 1 | 4,2 | 100,0 |
|  | Total | 24 | 100,0 | 100,0 |



Figure 7 Age group of the informants

All informants, with no exception, held a bachelor's degree in Medicine. All graduated from different Spanish universities (see Figure 8 below), apart from one being PH7, who graduated from the Universidad Central de Ecuador.


| $\square \square$ MURCIA | $\square$ GRANADA |
| :--- | :--- |
| $\square$ AUTÓNOMA MADRID | $\square$ OVIEDO |
| $\square$ NAVARRA | $\square$ COMPLUTENSE MADRID |
| $\square$ U.C. ECUADOR | $\square Z A R A G O Z A$ |
| $\square S A N T I A G O ~ D E ~ C O M P O S T E L A ~$ |  |

Figure 8 Informants' centre of studies

Most participants (54,2\%) graduated from either the Universidad de Navarra (HN1, HN2, HN3, HN5, HN6, PH2) or the Universidad Autónoma de Madrid (ALB3, PH3, PH4, PH5, PH8, PH9, PH11). The rest studied at the Universidad de Murcia (ALB1, PH10), Universidad Complutense de Madrid (PH6, PH12, PH13), Universidad de Granada (ALB2), Universidad de Oviedo (PH1), Universidad Central de Ecuador (PH7), Universidad de Zaragoza (HN4, HN8) and Universidad de Santiago de Compostela (HN7).

As it is common practice among doctors, they may not necessarily practise medicine in the same town for a long time, as they very often participate in selection processes involving competitive examinations ${ }^{41}$, which makes them work in different hospitals until they get a more permanent destination. Table 2 gives up-to-date information about the University each informant studied at and the hospital where they were at the time both practising medicine and doing their research in their various specialities.

[^25]| IDENTIFICATION <br> NUMBER | GRADUATED FROM <br> THE UNIVERSITY OF | CURRENTLY WORKING AT |
| :---: | :--- | :--- |
| ALB1 | MURCIA | COMPLEJO HOSP. UNIVERSITARIO DE <br> ALBACETE |
| ALB2 | GRANADA | COMPLEJO HOSP. UNIVERSITARIO DE <br> ALBACETE |
| ALB3 | AUTÓNOMA MADRID | COMPLEJO HOSP. UNIVERSITARIO DE <br> ALBACETE |
| PH1 | OVIEDO | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH2 | NAVARRA | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH3 | AUTÓNOMA MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH4 | AUTÓNOMA MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH5 | AUTÓNOMA MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH 6 | COMPLUTENSE MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH7 | U. C. ECUADOR | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH8 | AUTÓNOMA MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH9 | MURCIA | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH10 | AUTÓNOMA MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH11 | COMPLUTENSE MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH12 | COMPLUTENSE MADRID | HOSPITAL UNIVERSITARIO PUERTA DE HIERRO |
| PH13 | NAVARRA | HOSPITAL DE NAVARRA |
| HN1 | NAVARRA | HOSPITAL DE NAVARRA |
| HN2 | NAVARRA | HOSPITAL DE NAVARRA NAVARRA |
| HN3 | ZARAGOZA | HOSPITAL DE NAVARRA |
| HN4 | HOSPITAL DE NAVARRA |  |
| HN5 | NAVARRA | HOSPITALAL DE NAVARRA |
| HN7 | SAVARRA NAVARRA |  |
| HANAGO DE | ZARAGOZA |  |

Table 2 Informants' centre of studies and workplace

Once informants had provided some general information about their degree, field of research and professional career, they were asked to answer ten openended questions. As already mentioned, the first six questions explored in this section aimed, more specifically, at gathering details about the respondents' academic and professional background in English. The analysis of these questions helped enormously to characterise the sample. Each Survey Profile Question will now be exhaustively examined.

## Survey Question 1: How long have you been studying English?

## Survey Question 2: Have you ever lived abroad, in an English speaking country? If so, how long?

These two questions were intended to elicit the participants' overall exposure to the English language. The data shown in Figure 9 reveal that our informants
had been learning English for a number of years so far. Only four participants in the survey (ALB1, PH4, HN2, and HN8) stated that they had studied English for less than five years, whereas the vast majority of the sample (18 informants) had been learning English for more than five years.

Despite the fact that on average our doctors had spent about $13,16^{42}$ years studying English, the standard deviation $(9,74)$ should be carefully looked at in this case: while a $54,5 \%$ ( 12 informants) claimed that they had spent between four and ten years learning English, a remarkable 31,8\% (7 informants) revealed a minimum exposure of fifteen years to learning this foreign language. Figure 9 below presents the exact percentages ${ }^{43}$ :

## INFORMANTS' EXPOSURE TO ENGLISH

STUD.ENG

| N | Valid | 22 |
| :--- | :--- | ---: |
|  | Missing | 2 |
| Mean |  | 13,159 |
| Median |  | 10,000 |
| Mode | $4,0(\mathrm{a})$ |  |
| Std. Deviation |  | 9,7460 |

a Multiple modes exist. The smallest value is shown


Figure 9 Number of years studying English

[^26]With regard to participants living in an English-speaking country for a period of time, data reveal that $62,5 \%$ of our informants had spent some time abroad with the aim of improving their proficiency in English. Most (73,3\%) referred to one, two or three-month stays (ALB3, PH1, PH5, PH8, PH10, PH11, PH12, PH13, HN1, HN4, HN6), whilst the rest $(26,7 \%)$ referred to longer periods, ranging from four months (ALB1) to two academic years (PH7). Although they were not asked about the place they had stayed in, some participants included that piece of information in the surveys. The following Table displays all data found in the questionnaires:

| ID | LENGTH OF THE STAY | DESTINATION |
| :---: | :---: | :---: |
| ALB1 | 3 months <br> 1 months | USA <br> Australia |
| ALB3 | 3 months | $?$ |
| PH1 | 1 month | England |
| PH2 | 3 summers \& a whole <br> academic year | $?$ |
| PH5 | 2 months <br> $3,5-4$ months | Ireland <br> Sweden ${ }^{44}$ |
| PH7 | 2 years | England |
| PH8 | 3 months | Philadelphia |
| PH9 | 10 months | London |
| PH10 | 3 months | USA |
| PH11 | 3 months | $?$ |
| PH12 | 2 months | $?$ |
| PH13 | 3 months | Canada |
| HN1 | 1 month | $?$ |
| HN4 | 1 month | $?$ |
| HN6 | 1 month | Ireland |

Table 3 Informants' stays abroad
Survey Questions 1 and 2 turned out to be very useful as they enabled me to verify that eighteen subjects had devoted a minimum of five years to the continuous study of English. Indeed, seven out of those eighteen informants had been learning English for more than $13,16^{45}$ years on average. As will be discussed in Survey Question 4, this actually means classroom instruction of English for Specific Purposes (ESP), on the one hand, and content-based courses in English, on the other. Besides, fifteen informants reported to have lived in an English-speaking country for a minimum of one month. These two

[^27]factors cannot claim to prove (nor did they seek to prove) that all the informants can be placed within the same level of proficiency in English. However, it can certainly be stated that these twenty-four doctors had been attending English lessons for a number of years and a $62,5 \%$ of them had also been in real language communicative settings either for professional (conferences, work practices) or academic (COU ${ }^{46}$, scientific / English courses) reasons.

## Survey Question 3: How long have you been working in this hospital? What is your MIR ${ }^{47}$ speciality (field/research work)?

Informants were also required to specify their length of service in their current hospital in order to find out whether doctors from different hospitals had a comparable medical practice background and, given the case, whether they felt as part of their medical community.

Figure 10 reveals that participants can be easily grouped into three different categories as far as their experience working in their hospital is concerned: a) "new" doctors (less than five years working in that hospital), b) "settled" doctors (between five and ten years practising medicine in that hospital) and c) "senior" doctors (more than ten years in their current hospital).

## Statistics



ID
Figure 10 Informants' experience working in their current hospital

[^28]In addition, this question sought to gather information about the research areas our participants were more closely involved in so as to identify their main fields of expertise. A close look at their answers (cf. Table 4 below) suggests that these scientists fitted into different research areas according to their various $M I R^{48}$ specialities, namely Endocrinology and Nutrition (8 informants), Internal Medicine (7 informants), (Neuro)pathology (3 informants), Clinical Pharmacology (2 informants), Medical Oncology (2 informants), Neurology (1 informant) and Radiology (1 informant).

| Endocrinology \& Nutrition | Internal <br> Medicine | Clinical <br> Pharmacology | Medical Oncology | Neurology | (Neuro)Pathology | Radiology |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ALB1 | PH4 | PH5 | PH10 | HN1 | HN3 | HN7 |
| ALB2 | HN2 | PH6 | HN8 |  | HN4 |  |
| ALB3 | HN5* |  |  |  | HN6 |  |
| PH1 | PH9** |  |  |  |  |  |
| PH2 | PH11*** |  |  |  |  |  |
| PH3 | PH12 |  |  |  |  |  |
| PH7 | PH13*** |  |  |  |  |  |
| PH8 |  |  |  |  |  |  |

Table 4 Informants' medical specialities
*currently working at an Emergency Unit
** doing research work on Lupus
*** currently working at an HIV Unit
With reference to their various specialities, data have shown that informants fell into seven disciplines (cf. Table 4) and that had been working in their current hospital for about 6,4 years on average (cf. Figure 10). The survey also suggests that this factor plays an important role in the doctors' engagement with the institution. In the informants' view, being a doctor does not only imply dealing with patients, but also doing research. Unlike other disciplines or professional activities, research in medicine is understood as a team work rather than as an individual activity (Gledhill 2000:55). Thus, the longer they have been working for the same hospital, the more involved they will feel in the hospital's research lines. In this respect, it seems worth mentioning that this is the main reason why I refer to these group participants as a discourse community. Following Swales' (1990:9) approach, a discourse community can be defined as a group that has goals and purposes in common, and use

[^29]communication to achieve these goals. This close relationship will be more evident when it comes to the production of articles, which will be more extensively developed later on in section 5.3.

## Survey Question 4: Have you ever taken any course related to your speciality in English? When? What was the course about?

With the aim of obtaining additional information with respect to informants' exposure to English, they were asked about the training courses, if any, they used to take in English. Only ten participants declared that they had taken some courses related to their speciality in English. As Table 5 illustrates, their answers refer to two clearly distinct kinds of courses: content-based courses in English, on the one hand, and English for Specific Purposes (ESP) courses, on the other.

Three informants (PH5, HN1, HN4) stressed the fact that they used to attend conferences and congresses in English all through the year since English is the general language of communication in their discourse community:

> "the vast majority of our courses are in English. The last one took place two weeks ago in Paris. It was about 'Clinical Investigation in children'." (PH5)

| ID | TYPE OF COURSE |  | WHEN? |
| :---: | :---: | :---: | :---: |
| ALB2 | Using scientific English in Medicine | $?$ | 1 month |
| ALB3 | "EFES 49 |  |  |
| course on Clinical Endocrinology" | September 2003 | $\boldsymbol{?}$ |  |
| PH5 | Training speakers | 2005 | $\mathbf{1}$ week |
| PH10 | Most courses in English (i.e. <br> "Clinical investigation in children") | 2007 | 1week |
| PH11 | "Advancal presentations in English | 2006 | $\boldsymbol{?}$ |
| PH12 | Medical English" | 2006 | $\boldsymbol{?}$ |
| HN1 | Conferences, congresses \& | 2003 | $\boldsymbol{?}$ |
|  | training courses in English | all through the year | $\boldsymbol{?}$ |
| HN4 | Conferences, congresses (i.e. "Brain tumours") |  | $\boldsymbol{?}$ |
| HN7 | Neuroradiology | $2005-2006$ | 4 one-week <br> courses |

## ESP courses <br> Content-based courses in English

Table 5 Informants' training courses

[^30]Data (cf. Table 5) suggest that training is also a key issue among doctors. $41,7 \%$ of the informants (10) stated that they used to attend courses and seminars related to their speciality in English. It seems, though, that they interpreted that survey question in different ways; some of them ( $50 \%$ ) referred in their answers to the medical English language courses (i.e. writing medical presentations and/or reports in English, speech-making, using scientific English in medicine, to name but a few) whilst others ( $60 \%$ ) mentioned content-based courses related to their medical speciality taught in English (i.e. specialised courses organised by the European Federation of Endocrine Societies [EFES ${ }^{50}$ ], international seminars on neuroradiology, oncology, and the like).

Whatever the type of course, it seems clear that these informants were used to practising both oral and written skills in English for their everyday medical praxis. What is more, they all underlined the fact that English was essential in their field and thus they needed to be familiar with the English system in general and the kind of English characteristic of the discourse community they belonged to, in particular.

## Survey Question 5: Do you ever read academic papers/scientific articles in English? If so, how often? Which books/journals, etc. do they come from? <br> Question 5 attempted at verifying whether participants were used to reading scientific papers in English as well as finding out what kind of publications they highlighted as their primary information sources; that is, those books and/or journals they considered essential to their own field work.

All informants, with no exception, declared themselves as regular readers of English medical journals, mainly (cf. Table 6). The British Medical Journal (BMJ), the New England Journal of Medicine (NEJM) and the Journal of Clinical Endocrinology and Metabolism (JCEM) stood out as the most frequently read journals by eight doctors. Other journals like AIDS, Nature, the Lancet British Medical Journal, the American Journal of Medicine, the American Journal of

[^31]Neuroradiology, the American Journal of Radiology and the Journal of Bacteriology also constituted the informants' reading list.

The answers also suggested that both American and British journals used to be given much more priority than manuals and English textbooks: "I rarely read books in English" (PH2). However, the following manuals were mentioned once: Williams Textbook of Endocrinology, DeGroot's Endocrinology and Harrison's Endocrinology. In addition to journals and textbooks, PH5 mentioned reports and international dossiers as part of her everyday reading in English:
> "I'm working for the European Medicine Agency and the reports and dossiers I have to deal with are all in English. So everyday I have to read and write in English." (PH5)

When being questioned about how often they read scientific articles in English, a remarkable $58,4 \%$ ( 14 doctors) asserted that they read academic papers related to their field work on a daily basis. 25\% consulted English journals once or twice a week, whereas the remaining $16,6 \%$ did so with less frequency. See more detailed figures in Table 6:

| How often do you read academic papers/scientific articles in English? |  |  |
| :--- | :--- | :--- |
| Daily | 14 | $58,4 \%$ |
| Weekly | 6 | $25 \%$ |
| Every month (one article a month) | 2 | $8,3 \%$ |
| Every 3 months (one article; four articles a year) | 2 | $8,3 \%$ |

Table 6 Frequency of English journal reading

Reading scientific papers in English has thus also proven to be part of a doctor's almost everyday activity. As was expected, the range of sources was wide and clearly determined by the speciality each researcher was most interested in. Nevertheless, within the same speciality, doctors mentioned the same journals and, to a lesser extent, manuals as part of their daily/monthly reading list. What must be stressed, though, is that this question has revealed some very interesting methodological information. The following quotes appear
to suggest that reading in English is seen as a professional need since most medical journals are written in English:
"Yes, I do read scientific papers in English everyday. This is part of my job as a doctor." (PH4)
"Yes, everyday. Pathology books and journals. They are from USA, UK and Europe. I must be up-to-date with what is going on in neuropathology." (HN4)

Interestingly, two of the journals selected for the compilation of the HSC, the British Medical Journal (BMJ) and the Journal of Bacteriology were mentioned by thirteen informants. As was explained in section 3.2, the criteria followed for the selection of the medical journals compiled in the HSC was determined by two main factors: on-line accessibility and relevance. Even though the BMJ and the Journal of Bacteriology are addressed to the whole medical community rather than specifically to endocrinologists, pathologists or oncologists, participants underlined the impact of the medical journals selected for the HSC as central sources of current research on different medical fields.

## Survey Question 6: Do you usually write scientific papers in English? Which journals do you usually publish in?

This question provided details concerning the informants' written production in English. They were asked to comment on whether they used to write scientific papers in English on the one hand and, given the case, they were required to specify the kind of journals in which they published their papers. According to their information, participants can be divided into three main categories:
a) Group 1 (12,5\%): they published articles and/or reports in English on a regular basis (PH5, PH6, HN1).
b) Group 2 ( $\mathbf{3 7}, 5 \%$ ): they occasionally published articles in English (ALB2, ALB3, PH1, PH2, PH9, PH10, HN3, HN4, HN8).
c) Group 3 (50\%): they hardly ever published articles in English, but some other written productions were mentioned. (ALB1, PH3, PH4, PH7, PH8, PH11, PH12, PH13, HN2, HN5, HN6, HN7).

Only three participants in the survey (Group 1) acknowledged that they were used to writing up papers and/or reports in English to be published in different formats. HN1 mentioned she was a regular contributor to the European Journal of Neurology, Cardiovascular Diseases and Experimental Brain Research. PH5 commented on her frequent written contributions to the different events organised by the European Medicine Agency and, finally, PH6 highlighted her usual assessment reports for medicinal product agencies and expert reports for pharmaceutical companies.

Group 2 is formed by a total of eight doctors ( $37,5 \%$ ) who declared themselves as occasional English writers. With the only exception of ALB2, who had only published in Conference Proceedings ${ }^{51}$, the other members of this group named the following journals to which they had contributed: the European Journal of Endocrinology (ALB3), Journal of Endocrinological Investigation (PH2), Journal of the American Society of Nephrology (PH2), Journal of Rheumatology (PH5), AIDS (PH9), Annals of Rheumatic Diseases (PH9), Annals of Oncology (PH10), Clinical Cancer Research (PH10) and various (unspecified) journals on neurology and neuropathology (HN3, HN4) and medical oncology (HN8).

Finally, the number of informants who pointed out that they hardly ever published articles in English (Group 3) is remarkably high (50\%). But for PH13 who mentioned that she occasionally wrote summaries for International Conferences in English, the rest provided no further information in this respect.

Bearing in mind the importance of reading and writing to the dissemination of research, it was expected that data related to this question would reveal informants as regular writers of scientific papers as well. Thus, a 12,5\% seemed to be a very low percentage. By contrast, $50 \%$ of informants claimed that they hardly ever published articles in English. Such an assertion came as a surprise since I knew they all had publications in English ${ }^{52}$, so with the aim of shedding

[^32]light on this apparent inconsistency, I decided to contact PH2, who very kindly gave me details of their usual writing up process. He stated that research articles tend to be jointly written in a team, which means that different people are responsible for the different tasks and steps involved in writing up a scientific paper.


#### Abstract

"el trabajo suele ser conjunto; los residentes hacen el trabajo de campo, los adjuntos guiamos la publicación: qué tema abordar, qué datos publicar y la orientación general. La redacción suele hacerse en español y después traducirse al inglés para intentar 'colarlo' en alguna revista internacional. Nadie es totalmente responsable del artículo y suele ser el jefe o el que ha planeado el estudio el que figura como persona de contacto para correspondencia. (...) pero cuando se va a mandar a alguna revista 'top' sueles pasar el artículo a algún revisor, por ejemplo, profesores de inglés que suelen dar clases a médicos incluso en el mismo hospital. Controlar cómo escribir nuestro tipo de artículos en inglés, como ves, es esencial para nosotros." (personal communication with PH2, 08/17/2007)


Most importantly, in my view, is that the writing up of a paper is understood as a process where different tasks are assigned to different agents: housemen (MIR) are responsible for the field work and are also in charge of checking for specific information in the lab, whereas assistant doctors guide the publication and take decisions with regard to the topic, the data analysis and the overall orientation of the research question(s). The actual writing up of the article is usually done in Spanish and then is translated into English (see further details in the discussion of the writing process in section 5.3). Thus, any written production is also seen as a team work, which seems to be the reason why they feel they have not published in English.

Having explored the defining traits of the medical community under study, the following section presents a description of the worksheet of exercises distributed among participants in the sample as well as a detailed account of the various steps taken in their design process.

### 3.5 Worksheet of exercises

Along with the initial Survey ${ }^{53}$ and the Consent form ${ }^{54}$, informants were handed out a worksheet consisting of four different exercises especially designed for the current research. The analysis of these exercises supplied an incredible amount of data with respect to the participants' competence in the use of abstract nouns in medical English. The comparison between the data extracted from the HSC (cf. chapter 4) and the worksheet of exercises yielded some interesting results that will further be discussed in chapter 5 .

As pointed out earlier, the main purpose of these exercises was exploring the way in which participants (i.e. non-native speakers of English) made particular collocations with the abstract nouns selected. So as to determine the contents and plan the design of these exercises, I focused on the recurrent lexicogrammatical patterns of the nouns under study across the HSC (see sections 4.3-4.7). All the examples included in the designed worksheet were therefore extracted from the compiled corpus.

The careful examination of the recurrent patterning associated with abstract nouns in the HSC revealed very interesting findings with reference to their behaviour in the health science discourse (cf. section 4.8) and it also raised the following issues: a general tendency for the use of classifying adjectives, delexicalised uses of verb collocates, grammaticalized multiword units and a preference for the use of periphrastic structures in passive forms. With the aim of determining whether the above processes posed problems to the non-native informants of my study, I designed four exercises, each of which attempted at providing reliable data concerning the participants' competence with respect to the colligational and collocational patterns of the selected abstract nouns.

Originally, the initial repertoire of exercises consisted of six different activities and the number of items per task was considerably higher. When producing the first draft, I decided to shorten the worksheet so as to prevent informants from dropping out of the study. The final worksheet is made up of two "Matching"

[^33]exercises (Exercises 1 and 4), a "Fill-in the gaps" question (Exercise 2) and a "Sentence-translation" activity (Exercise 3). ${ }^{55}$

In Exercise 1, informants were asked to associate nineteen adjectives with the abstract nouns considered in the research (i.e. agreement, comparison, conclusion, contribution and decision). It was clearly stated in the instructions that several combinations were possible; that is, it was stressed that each noun could be paired with more than one adjective from the list provided and, similarly, each adjective could be applied to more than one noun. Respondents were also warned that some adjectives could be left out.

It must also be pointed out that fifteen out of those nineteen adjectives had been found to be frequent collocates of at least one of the abstract nouns considered. In contrast, the other four adjectives included in the exercise (i.e. contradictory, fashionable, short and unforeseeable) could not be found in combination with those nouns in the HSC. But for the size descriptor, short, the other opinion descriptors (i.e. contradictory, fashionable and unforeseeable) were randomly selected. The choice of short, on the contrary, was determined by the fact that it was expected that some informants would have difficulties in distinguishing between little, small and short, since they are similar in meaning and may have similar translations into their L1 (Spanish). ${ }^{56}$

With the purpose of examining what collocates the informants regarded as the most usual ones in combination with the nouns of interest, in Exercise 2 respondents were given fifteen real sentences extracted from the HSC. They were asked to fill in the gaps provided with a suitable word, which depending on the context could be a preposition or a verb ${ }^{57}$. As will be illustrated and discussed in section 5.1.1, this activity revealed very interesting findings regarding the participants' level of linguistic competence, as far as the collocational patterns associated with abstract nouns is concerned.

[^34]The "Sentence-translation" activity (Exercise 3) consisted of a total of eight Spanish sentences for which informants were required to provide suitable translations into English. For the designing of this exercise, eight real examples from the HSC were randomly selected from the concordance lines provided by WordSmith Tools ${ }^{58}$ and, subsequently, translated into Spanish. The main purpose of this task was to get participants to face a real scenario of linguistic production and find out the kind of constructions they used when being asked to translate into English the multiword units analysed in this research. The wide range of structures observed in the collected data offered highly valuable information with regard to their command of English morphology, syntax and semantics (cf. section 5.1.2).

Like Exercise 1, the last activity of the worksheet corresponded to a "Matching exercise" (cf. section 5.1.4). This time respondents were asked to associate certain highly-frequent verbs in English; namely, make, draw, reach, lead to, take and do with a list of thirty-six nouns, which had proven to appear in combination with the above mentioned verbs. Despite the fact that all the noun phrases included in Exercise 4 were collocates of at least one of the verbs from the list, some of them (i.e. experience, a guess, a verdict, a place, a picture, an exam, a goal, a profit, a speech, knowledge, skills, some writing, notes and [financial] success) were not traced in the HSC in combination with the above verbs.

By comparing informants' collocational preferences against the actual word combinations found in the HSC, I aimed at examining the possible mismatches between them and discussing their implications. As results will be measured against native production, I shall refer to the collocations provided by the informants as either morphologically, syntactically or semantically inappropriate/deviant combinations or (un)likely to occur in the native corpus data. All the observations made and the reported findings for each exercise will be discussed in chapter 5 (cf. sections 5.1.1-5.1.4).

[^35]
### 3.6 Summing Up

This chapter has focused on the inquiry methods used in this corpus-based research. The HSC corpus that forms the basis of my analysis as well as the corpus tools used in retrieving data from it were presented in section 3.2. Section 3.3 informed about a survey distributed among a group of twenty-four Spanish doctors, which has provided very useful data with reference to the participants' profile as well as their main difficulties when writing their scientific papers in English.

The participants' profile, based on the information obtained from the Survey Profile Questions, was carefully examined in section 3.4. These questions revealed that participants believe they must be familiar with the kind of English used in the medical community they are part of. This necessarily entails, as will be further analysed, that they need to develop reading and writing skills which will help them identify, understand and produce structures and word combinations typical of the style of the scientific discourse.

Another remarkable finding from the Survey Profile Questions pointed to the informants' publications in English. The fact that half of the participants claimed that they did not use to publish articles in English contributed to the characterisation of their writing up process. This investigation has demonstrated that one of the main reasons why informants sounded extremely cautious in declaring themselves as regular writers in English lies in the fact that, as PH2 reported, the main writing up tends to be done by a translator and/or an English teacher who provides expert advice on the draft produced by the research team. Each researcher sees themselves as a contributor to the research itself but not as the actual writer of the final product. Many people contribute towards the building up of that final product, so that seems to be the reason why the writing of an article is interpreted as an ongoing activity: a paper is produced and redrafted by several participants.

In section 3.5 the materials, in the form of a worksheet of four exercises administered among informants, specifically designed for this investigation, were presented. In the next chapter, I set out a comprehensive examination of
the collocational patterns in which the selected abstract nouns can be found in the HSC.

## CHAPTER 4: NATIVE CORPUS DATA ANALYSIS

### 4.1 Introduction to the chapter

This chapter is devoted to the analysis and discussion around the findings from the HSC corpus as well as further comparison from the British National Corpus (BNC). Firstly, in section 4.2 some considerations regarding the collocational patterning of abstract nouns in the HSC will be presented. Secondly, sections 4.3-4.7 will describe the collocational behaviour of the following abstract nouns; conc/usion, agreement, comparison, contribution and decision. This is followed by a discussion of the overall results (section 4.8), with a view to exploring the particular phraseology of abstract nouns in the health science discourse as well as considering the different functions they can acquire because of the different patterns of co-selection they may entertain. Section 5.2 (cf. chapter 5) will offer a comparison between these specific phraseological and collocational properties and the data obtained from the informants' performance in the worksheet of exercises. This comparison will outline the main difficulties the phraseology of abstract nouns poses for the selected discourse community when writing their scientific articles in English.

It must be noted that the decision to analyse abstract nouns was based on the findings from a study ${ }^{59}$ conducted on the behaviour of the noun conclusion and its restricted collocations in scientific register. While focusing on that abstract noun, it became apparent that there was a frequent list of comparable nouns, etymologically related to a verb (conclusion ~ conclude; agreement ~ agree; comparison ~ compare; contribution ~ contribute and decision ~ decide, to name but a few), which needed more thorough investigation.

The selection of five abstract nouns (i.e. conclusion, agreement, comparison, contribution, decision) set out in sections 4.3-4.7 was motivated by the fact that they were frequently used in combination with verbs. Other significant collocates (prepositions, adjectives, clauses and related verbs: conclude, agree, compare, contribute and decide) have also been included in the analysis, so as to provide a comprehensive account of the syntactic and semantic behaviour of

[^36]the above-named abstract nouns. In order to present this study more systematically, the most salient lexico-grammatical patterns of each noun will be described in turn ${ }^{60}$.

### 4.2 The collocational patterning of abstract nouns in the HSC. Some preliminary considerations

Abstract nouns in combination with other parts of speech are frequently used in the academic register to refer to scientific processes, methods, evidence and findings. A detailed study of the patterns of abstract nouns in the HSC has revealed a vast amount of phraseological units whose overall meaning is the result of the interaction among its various elements. As will be shown later, some of the collocates these frequent abstract nouns co-occur with have undergone a process of delexicalisation and semantic bleaching, which means that these nouns mostly provide the semantic content to the whole unit. In most cases, such abstract nouns collocate with delexicalised or support verbs which contribute very little to the meaning of the whole unit. It is thus the larger unit that is the complete unit of meaning, rather than the individual lexical items.

This phenomenon has already been pointed out in innumerable corpus studies which highlight the importance of multiword units in linguistic production (Sinclair 1991; Gledhill 2000; Altenberg \& Granger 2001, Oakey 2002; Stubbs 2001; Simpson 2004). In line with Sinclair's idea that meanings are clustered into lexico-grammatical patternings and not in isolated terms, the following five sections focus on the recurrent sequences of words ${ }^{61}$ in combination with the abstract nouns under study that commonly co-occur in the health science discourse.

In Partington's words, the process of delexicalisation involves "the reduction of the independent lexical content of a word, or group of words, so that it comes to

[^37]fulfil a particular function but it has no meaning apart from this to contribute to the phrase in which it occurs." (Partington 1993:183). In this respect, expressions such as make a conclusion, reach an agreement, make a comparison, make a contribution and make a decision must be analysed as multiword units, where the abstract noun provides the semantic content to the extended lexical string of words to the detriment of the semantic content of the lexical verb. Such restricted verbs have adopted a more grammatical role and simply perform a verbal function.

As Partington (1993) observes, the notion of delexicalisation is closely related to Sinclair's concept of shared meaning, "a distribution of meaning across a number of words" (Sinclair 1987b:110), which accounts for the fact that single words and their context of appearance are mutually co-selected: "words in English do not normally constitute independent selections (...) The item and the environment are ultimately not separable." (Sinclair 1992:15).

According to Sinclair (1997:323), semantic depletion is common with high frequency words, which tend to lose their independent meaning and adopt a more grammatical role. The analysis of $\mathbf{V}+$ Noun periphrastic structures in the corpus data reinforces this statement. In this view, the boundaries between a lexical item and its environment become fuzzy. Evidence from the HSC has revealed that delexical uses of verbs co-occurring with abstract nouns are usual. The conclusion to be drawn from this fact is that the more delexicalised a unit is, the more widely it collocates (Partington 1993:183).

When stressing some of the benefits of corpus work, Tognini-Bonelli (2001:24) highlights the fact that it shows the strict correlation between lexical and grammatical choices which extends the boundaries of a given initial unit, giving rise to the creation of extended units of meaning. The exploration of abstract noun patterns in terms of this interdependence of lexis and syntax has also led this study to the consideration of another linguistic phenomenon referred to as grammaticalisation.

Hopper \& Traugott (1993:2) define such a linguistic process as a "subject of linguistic changes whereby a lexical item or construction in certain uses takes on grammatical characteristics, or through which a grammatical item becomes more grammatical'. This notion of grammaticalisation points to the fact that certain lexical items and constructions in certain contexts serve different grammatical functions.

Since first introduced by the German neogrammarian Georg von der Gabelentz ${ }^{62}$ (1891), many scholars (Sweetser 1988; Sinclair 1992/1997; Hopper \& Traugott 1993; Partington 1993; Howarth 1996; May Fan 1999; TogniniBonelli 2001; Aitchison \& Lewis 2003, among others) have made use of several locutions, such as semantic change, desemanticization, fading meaning, depletion ${ }^{63}$, to name but a few, to refer to semantic bleaching as a key notion that "pertains almost exclusively to late stages of grammaticalization" (Hopper \& Traugott 1993:98) ${ }^{64}$.

The concept of grammaticalisation thus should be regarded as closely related to the aforementioned process of delexicalisation. In Tognini-Bonelli's view,

> "delexicalisation very rarely is an end in itself. In most cases it signals a new role for the original unit. More studies are needed to understand this phenomenon thoroughly; from the evidence available, however, it would seem that there is a tendency for delexicalisation to coincide with grammaticalisation; i.e. the process by which, with the passage of time, certain items lose their lexical meaning and acquire a grammatical function. It would also seem that it is very common words, which are used in a large number of contexts that are more exposed to the phenomenon of delexicalisation and are more likely to lose their independence to 'mean' with other words." (Tognini-Bonelli 2001:123).

[^38]However, this continuum between delexicalisation and grammaticalisation cannot be understood as an automatic association of fading meaning (semantic bleaching or verbleichen in Gabelentz's ${ }^{65}$ terminology) and sudden semantic loss with grammaticalisation. As Hopper \& Traugott (1993:95) highlight, "when a form undergoes grammaticalization from a lexical to a grammatical item, some traces of its original lexical meanings tend to adhere to it'; that is, at an initial stage of grammaticalisation, there is a redistribution of meaning, but not a complete loss of semantic content. On the contrary, meanings tend to be weakened and former lexical items gradually become empty syntactic elements.

All these processes along with some other observations made with reference to the lexico-grammatical patterning of abstract nouns in medical writing will be analysed in the pages to follow.

### 4.3 The patterns of the noun conclusion

In order to discover the lexical items that usually co-occur with the abstract noun conclusion, concordance lines from the HSC will be studied. Figure 11 below shows some of the concordance lines for this node word:

```
WordSmith Tools -- 07/05/2008 15:16:17
N Concordance
382 there were no interferences with the
    by N17 Rac, and therefore support the conclusion drawn from the use of the V
    velopment to term was much better. The conclusion drawn from this elegant
    etween vital and nonvital genes, so the conclusions drawn here should apply to
    the Results section) also supports the conclusion for maize. It is clear that
    H. virescens were consistent with the conclusions from 40 T. ni; M2R addition
    mplete nuclear division, confirming the conclusion from the earlier experiment
    e precursor tissue of the fetus.29 The conclusion from examining both coat
    ng to ensure adequate accuracy of the conclusions; in our case 10 000
    odological quality did not affect the conclusions. Interestingly, the two tri
    are thus completely independent. The conclusion is therefore reinforced that
    mechanism is postulated to explain the conclusions, it is difficult to know
    and Wiese [1997] further criticize the conclusions of Templeton and Read [198
    s have been completed since 1992, the conclusions of the original review may
    ctomyosin-based contractile ring at the conclusion of mitosis has long been a
    tonic swelling, are consistent with the conclusions of our analysis of 2D
    as judged at P < 0.05. RESULTS At the conclusion of the freezing trials, the
    his assertion, however, contradicts the conclusions of Hatini et al. (1996).
    a numbered 10 cm wooden stake. At the conclusion of the count, one researcher
    eing present in equal frequency at the conclusion of both meiotic divisions
    rgets children aged under 1 year. The conclusions of this meta-analysis
    the leader peptidase. This supports the conclusions of Strom and Lory (41) an
    stify her statement about refuting the conclusion of elk scarcity. If any
    lobster NHE is regulated in vivo. The conclusions of this investigation
```

Figure 11 List of concordances of the noun conclusion (extracted from WordSmith Tools)

[^39]The lexico-grammatical patterning of this noun is straightforward. Associated with it in colligation we find verbs, prepositions, that-clauses and adjectives. These combinations must be analysed in much more detail so as to provide a motivated description of its various meanings and functions.

## a) The noun conclusion as an introductory item

One of the most prominent uses of conclusion is as a heading/subheading introducing a section of the scientific article. 184 occurrences (out of 578) reveal that this can appear in isolation or in combination with other fixed expressions such as the following: summary and conclusion, conclusion and future directions, conclusions and prospects, conclusions and unresolved issues, conclusions and speculation. As can be seen in the above examples, these expressions are all related to further research on the conclusion stated in the article they appear.

In regard to its morphology, it should be stressed that there does not seem to be any syntactic and/or semantic difference between the base form (conclusion) and the inflected form for the plural (conclusions). However, there is a preference for the latter (145 occurrences) in comparison with the former (39 occurrences).

The initial expectation was to find this structure more frequently in the data as the different sections of an article are clearly distinguished by the use of subheadings. 394 occurrences of such an abstract noun give evidence of the fact that the conclusions drawn in the HSC tend to be introduced by means of more elaborated constructions, as will be seen in the following pages.

## b) verb + conclusion

In the study of this abstract noun, another remarkable pattern that can be traced is the Verb + noun colligation. The following Figure charts the numerous verbs that collocate with the noun conclusion:


Figure 12 Verb + conclusion collocates in the HSC
As can be seen in Figure 12, there are several verbs that collocate with conclusion, so it seemed necessary to group them according to the different patterning and meanings associated with each of them. When combining with verbs, this abstract noun may perform the syntactic function of Object or Oblique (introduced by dummy prepositions) and can follow different types of verbs. From a syntactic point of view, thus, these verbs share the same syntactic behaviour, whereas semantically-driven differences can be identified.

The frequent use of this abstract noun in combination with a group of restricted collocates is of particular interest. All these verbs are used in a specialised or figurative sense and have undergone, as will be further discussed in section 4.8, a certain degree of delexicalisation and semantic bleaching; that is, it is the noun itself that mostly provides the semantic content to the whole unit. On the contrary, arrive at, come to, draw, lead to, make and reach have lost their full semantic content of reach a place, move, decide, take someone somewhere and arrive, respectively, and form part of extended lexical units. As TogniniBonelli (2001:116) points out, these verbs simply carry the verbal function and
at the same time allow the noun conclusion to remain as a noun, but they have lost their primary meaning and have adopted a more grammatical role.

Another significant feature of these restricted collocates lies in the fact that they are all equivalent to the corresponding verb of conclusion; that is, conclude, and, therefore, they are equally interchangeable. The following figures show the frequency and percentage of occurrences of both restricted and free collocates, based on the overall number of occurrences of Verb + conclusion (192) in the HSC:

| Verbs that collocate with the abstract noun <br> conclusion in the HSC | Number of occurrences (\%) |
| :---: | :---: |
| DRAW | $26(39,4 \%)$ |
| LEAD TO | $17(25,7 \%)$ |
| REACH | $13(19,7 \%)$ |
| MAKE | $6(9,1 \%)$ |
| ARRIVE AT | $2(3,03 \%)$ |
| COME TO | $2(3,03 \%)$ |


$\square$ DRAW $\square$ LEAD TO $\square$ REACH $\square$ MAKE $\square$ ARRIVE AT ■ COME TO
Figure 13 Percentages of occurrences of restricted collocates of the type Verb + conclusion

| Verbs that collocate with the abstract noun <br> conclusion in the HSC | Number of occurrences (\%) |
| :---: | :---: |
| SUPPORT | $67(53,2 \%)$ |
| CONFIRM | $9(7,1 \%)$ |
| BASE | $6(4,8 \%)$ |
| JUSTIFY | $3(2,4 \%)$ |
| REINFORCE | $3(2,4 \%)$ |
| CONTRADICT | $3(2,4 \%)$ |
| PRODUCE | $2(1,6 \%)$ |
| EXPLAIN | $2(1,6 \%)$ |
| DISAGREE WITH | $2(1,6 \%)$ |
| CRITICIZE | $2(1,6 \%)$ |
| ACCEPT | $2(1,6 \%)$ |
| Others: accompany, add weight to, affect, <br> allow, alter, challenge, dismiss, doubt, <br> emphasize, express, flaw, group, highlight, <br> influence, modify, publish, question, refute, <br> strengthen, suggest, test, undermine, verify | 1 (0,8\% each = 18,4\% in total) |
| Overall number of occurrences: 126 (100\%) |  |



| Q SUPPORT ■REINFORCE ■EXPAIN $\square$ OTHERS | $\square$ CONFIRM $\square$ CONTRADICT $\square$ DISAGREE WITH | QBASE - LIMITITIZE CRITICI | $\begin{aligned} & \text { बUUSTIFY } \\ & \text { PRODUCE } \\ & \text { ACCEPT } \end{aligned}$ |
| :---: | :---: | :---: | :---: |

Figure 14 Percentages of occurrences of free collocates of the type Verb + conclusion

In the following pages, restricted collocations will be examined. According to Firth's statement (1957:179): "you shall know a word by the company it keeps", there is no doubt that these restricted collocates give the observer a great deal of information. Each verb has its own specific particularities, but an undeniable generalisation can be made about the pattern they share.

With a total of 26 occurrences (8 in the active voice and 18 in the passive), draw is the most frequently used delexicalised verb in combination with conclusion. Consider the following examples extracted from the HSC:

```
WordSmith Tools -- 07/05/2008 16:22:09
    rials are therefore needed before any conclusion can be drawn about the
    ntal transfer are necessary before any conclusions can be drawn about the
    nt quality to draw definitive conclusions Limited evidence
    tal. There were too few twins to draw conclusions. Several variables were not
    in Drosophila. Where possible we draw conclusions that have broad implication
    lity should be considered when drawing conclusions from observations in chimer
    the student has little insight into how conclusions are drawn. Here, the redee
    rrors (discussed below). Two important conclusions were drawn from this study.
    lami.(24) Overall, the most interesting conclusion to be drawn from these obse
    ion mutants were generated in total. No conclusion drawn in this manuscript wa
    f distinct genes, we can draw several conclusions about Nipped functions and
    d, GAL4\pmBcd or Bcd\pmVP16. Several conclusions can be drawn from the gene
    n-Alder and Bennett (Æ81) drew similar conclusions for animals generally. Esti
    culate, quite reasonably, that similar conclusions might be drawn about many d
    s no effect on body weight. The simple conclusion drawn from these genetic obs
    h45 mutation). Before drawing strong conclusions from the above DNA sequenc
    across-generation analyses support the conclusions drawn from the within-gen
    etween vital and nonvital genes, so the conclusions drawn here should apply to
    by N17 Rac, and therefore support the conclusion drawn from the use of the V
        uteri of mice mated to t/1 males. The conclusion drawn is that TRD cannot be
    velopment to term was much better. The conclusion drawn from this elegant stud
    t there were no interferences with the conclusions drawn because of alkanes f
    sm driving the outbreaks. In turn, the conclusions that one can draw from thi
    er field conditions. Nonetheless, the conclusions that can be drawn from eac
    bias. Discussion The conclusions that can be drawn from our
    but the data do not permit unequivocal conclusions to be drawn. Using CTC
```

Figure 15 Overall number of occurrences of draw + conclusion in the HSC

This periphrastic use reveals a syntactic preference for passive constructions (18 out of 26 occurrences), which is typical of academic writing. In these cases, the source of the drawn conclusion is expressed by means of a prepositional phrase, introduced by the dummy preposition "from", whose dependency (a noun phrase) refers to scientific processes and mechanisms: observations, studies, experiments, procedures, etc.

The examples given so far demonstrate that concepts such as delexicalisation and semantic bleaching have become central in the identification of word
meaning. A semantic shift from the core meaning of draw as "make, create something", in its literal sense, towards the meaning of "draw a conclusion = conclude" has undoubtedly taken place. What also seems worth noting is that this delexicalised use of draw also entails a change in the semantic roles of the participants involved in "drawing a conclusion". Consider the following example from the corpus: "where possible we draw conclusions that have broad implications". The subject "we" can no longer be interpreted as the agent (active instigator of an action) but as the experiencer who concludes something after discussing it carefully.

What has been posed so far about draw + conclusion can also be applied to lead to (17 occurrences), reach (13 occurrences), make (6 occurrences), arrive at (2 occurrences) and come to (2 occurrences). Unlike reach, though, the other delexicalised verbs tend to appear in passive constructions. It seems worth mentioning, however, that the periphrasis "reach a conclusion" hardly subcategorises for an animate volitional Subject but for noun phrases associated with demonstrable, evident data. The same could be said about "arrive at / make a conclusion", as the following examples extracted from the HSC show:

1. Studies of ftsZ transcription in E. Coli have reached conflicting conclusions.
2. Other cells with multiple spindles have reached conclusions that agree with those drawn from studies...
3. Previously published studies could not have reached this conclusion.
4. The analysis of this pathway allowed several important conclusions to be made.
5. Three recent studies arrived independently at the conclusion that of those genes in the yeast genome for which...

As regards arrive at (2 occurrences) and come to (2 occurrences), it should be stressed that these collocates are rare in the HSC. In contrast, a random search for conclusion in The British National Corpus demonstrates that they are frequent collocations. From a corpus-based approach these two verbs should have been identified as prominent collocates of this abstract noun, but evidence from the health science corpus would not have supported such statement. A
corpus-driven approach, on the contrary, takes the evidence as the starting point. This method, as Francis (1993:155) suggests, allows the investigator "considerable freedom of movement". Some expressions may be frequent in some contexts but almost non-existent in others, as Figures 16 and 17 report:

```
sublethal infections and came to four conclusions. (1) Individuals survi
345go. Cooper and Penny(8) come to similar conclusions for modern bird gr
2 3 ~ n t ~ s t u d i e s ~ a r r i v e d ~ i n d e p e n d e n t l y ~ a t ~ t h e ~ c o n c l u s i o n ~ t h a t ~ o f ~ t h o s e ~ g e n e s
501endocytic pathway. We arrived at this conclusion because endocytosed
```

Figure 16 Overall number of occurrences of arrive at / come to + conclusion in the HSC

## Results of your search

Your query was

## conclusion

JY1 1885 It was a foregone conclusion, I soon realised, that after university he'd start up his own firm with some money his father left him.

HNM 60 The assumptions made earlier in this chapter may be used to derive what has become known as the `separation theorem'; which underpins the foregoing conclusion.

ACH 887 I have for myself come to the conclusion that owing to the conditions which exist in the world today, having regard to the economic environment, having regard to the situation of our country, if we go on pattering along as we are we shall have grave unemployment with us to the end of time, and I have come to the conclusion that the only way of fighting this subject is by protecting the home markets.

ASF 767 St Augustine came to the conclusion that we can measure time only if the mind has the power of holding within itself the impression made by things as they pass by even after they are gone.

CB9 974 In 1984, radio astronomers from Columbia University identified electro-magnetic vortices in our Milky Way and arrived at a similar conclusion to the theories of Alfven and Perratt.

EVX 139 We have come to this conclusion quickly.
FBM 445 This was the closest Neil had ever come to Wembley and on the way home that night he came to the conclusion that this was the closest he would ever come in his entire life.

FBT 134 I reach that conclusion, I hope, having properly considered the pros and cons of the situation; the fact that he has this particular advantage as a police officer in marshalling evidence; considering the issues.

H81 1252 I think I should add very shortly that having considered the many authorities cited, even if I had come to a different conclusion on the issue about consideration, I would have come to the same decision adverse to the owners on the question whether the payments were made voluntarily in the sense of being made to close the transaction.
Figure 17 Random selection of the search word conclusion from The British National Corpus

On the other side of the coin, a wide range of free verbs have been found in colligation with the abstract noun conclusion. Contrary to what was observed with restricted collocates, verbs such as support, confirm, base, reinforce, limit, contradict, etc. do not equal the meaning of the verb conclude. Thus, the phenomenon of delexicalisation is not present here since each of these free collocates add their own particular meaning to the object conclusion. Take the following examples as an illustration ${ }^{66}$ :
6. These across-generation analyses support ( $\neq$ conclude) the conclusions drawn from the within-generation models. ~ *These across-generation analyses conclude the conclusions drawn from the within-generation models.
7. These across-generation analyses support the conclusions drawn (= conclude) from the within-generation models ~ *These across-generation analyses support what the within-generation models concluded.

The verb support deserves special attention as it stands out as the most frequent free verb collocate (a total of 67 occurrences out of 126) in combination with conclusion. Although there is a wide range of verbs that collocate with this abstract noun, some of them appear just once in the corpus (see Figure 14 for exact percentages and number of occurrences). The verb support is much more frequently used (71,6\%) in the active voice and the subjects it subcategorises for are hardly ever performed, but for one exception ${ }^{67}$, by animate volitional entities. On the contrary, they are realised by NPs that fall into the same semantic field (i.e. observations, results, data, etc.) See the examples below:
8. The data presented in this paper support the following conclusions.
9. These observations strongly support our conclusion.
10. These findings were used to support the conclusion.
11. Considerations of ultimate and proximate function support the conclusion that...
12. Taken together, our results support the conclusion.
13. The present experiment seems to support this conclusion.

[^40]After having described the behaviour of the Verb + Noun [conclusion] pattern in the HSC, it can be concluded that when such a pattern does not equal the meaning of its cognate verb conclude, the use of a periphrastic construction is undeniable. At the other end of the continuum, it is an evident fact that the occurrences of conclude (418) outnumber the occurrences of restricted collocates (66), but as syntax and lexis are co-selected, "we cannot look at either of them in isolation" (Francis 1995). If reach, make, draw, lead to, arrive at and come to equal the verb conclude, what is the point in using periphrastic constructions? Is there any difference between analytical and synthetic structures? One specific finding which clearly emerges from the corpus data is that there seems to be a preference for the periphrastic use (i.e. delexicalised verb + conclusion) in passive structures, whereas in the active voice there is a strong tendency for "conclude" to be used.

## c) conclusion + preposition

The abstract noun conclusion is commonly followed by prepositional phrases dependent of nouns. See the Table below:

| conclusion OF~ | analysis, investigation, results, studies \|| Hatini et <br> al., Peschken and Sawchyn, Templeton and Read |
| :--- | :--- |
| conclusion ABOUT~ | efflux, toxicities \|| levels, programs, structures || <br> risks |
| conclusion ON $\sim$ | this \|| the scale's invulnerability |
| conclusion FROM $\sim$ | this \||analysis, data, observations, studies |
| conclusion FOR~ | findings \|| (bird) groups |

Table 7 Frequent NPs as Prepositional complements of the conclusion + preposition collocational pattern

A significant property that can be applied to the prepositions about (notably dependent of the noun conclusion as it states the nature / typology of what is being concluded) and of is what Huddleston and Pullum (2005:136) refer to as grammaticised uses of prepositions. The role of such prepositions here is not to serve to indicate spatial and / or temporal relationships of nominals to each
other, typical of prepositions, but to mark certain grammatical functions. Consider the following HSC instances:
> 14. Ignoring chemical persistence may lead to erroneous conclusions about the risk that a chemical poses to an ecosystem.
15. The biological conclusions about the program are not justified.
16. We also highlight an important conclusion of these studies.
17. Willis and Wiese [1997] further criticize the conclusions of Templeton and Read [1983, 1984]

The preposition about in the Prepositional Phrases in examples (14) and (15) marks the complement of a noun (conclusion). This noun allows a Prepositional Phrase introduced by a particular preposition, which is specified by the noun itself. Thus, this preposition determines the kind of conclusion the writer is referring to. This function can also be performed by a "that-clause", which usually ( 71 occurrences) follows the abstract noun under study. See the examples:
18. This lends a degree of robustness to our conclusion that universal screening would be cost effective.
19. Thus, these results support the conclusions that Africans are the most divergent population.

The underlined sequence in example (17) is a NP within which of marks the NP (Templeton and Read) that equals the Subject of the corresponding clause ("What Templeton and Read [1983, 1984] concluded was further criticized by Willis and Wiese [1997]"). According to Huddleston and Pullum (2005:136), "what makes 'grammaticised' an appropriate term for such prepositions is that where they are placed in sentences depends not on what they mean but entirely on rules of the grammar." This is especially noticeable in the case of the preposition of, which has no meaning of its own and there is no possibility of replacing it by any other preposition. This statement cannot be applied to about as it can also be replaced by the preposition on (2 occurrences), which is much less frequently used, though.

## d) preposition + conclusion

The pattern in conclusion is particularly salient in the HSC (65 occurrences) due to its frequent use as a discourse marker. It is obvious throughout the corpus that this construction constitutes an extended unit of meaning and must thus be understood as a whole, rather than the juxtaposition of the individual meanings of in + conclusion. Likewise, by a further process of grammaticalisation, such a construction in this particular linguistic context of scientific discourse has come "to serve (a) grammatical function and, once grammaticalized, continues to develop new grammatical functions" (Hopper \& Traugott, 1993:18).

Understood as a lexical bundle ${ }^{68}$, this holistic unit appears to have undergone a process of semantic shift, being equivalent to "sum up, finish, end up with something". It definitely serves the discourse function of introducing a summary and anticipating that the discourse is about to come to an end. It is also particularly notable the fact that it is separated from the rest of the text by means of a comma, which contributes even more to underline its entity as a boundary marker; more specifically, as a summative conjunct.

As observed with other kinds of collocates, the noun phrases associated with the abstract noun conclusion are characteristic of the described register; that is, they all belong to the field of results, findings, studies, reports, analyses and measurable data. Consequently, it comes as no surprise the fact that the construction in conclusion is commonly used introducing summaries and overt evaluations related to that semantic field, as shown below:

[^41]ce their introduction into captivity ry precursor to gpl20-binding to CD thway for release of HSPs from cells. oPA in the overexpressing ce11s
e cells resident in the cerebellum. bules to carry all the chromosomes er incorporation compared to controis rate domatia into new grape cultivars. to the subjects' background diets. $\mathrm{P}-1$ to combat human kidney disease. nsible for these devastating diseases except at the highest dose employed. except at the highest dose employed. s to be more appropriately focused. ell are necessary for ball formation. and maintain barrier function
phosphorylation by FrzE for function of the replacement of Glu \#\#
ers of midgut cells that are infected. the other growth factors investigated. on are currently under investigation. -lung eNOS protein levels is not know. f caveolar or DIG localization
thelium-derived vasoactive mediators. pervirulent lineages of meningococci. endotoxemia in the feline mesentery. light
microscopy.
ed by its association with MTP
replete with No do not receive No.
marily for penetration of the oocyte. a degra- dation by paraoxonase.
presumably it was correctly positioned
$A$ to escape the host immune reparations A to escape response taining MB to $37^{\circ} \mathrm{C}$ (data not shown) $t$ participate in p120/p100 signalling. of several of the minor species. rmational changes in these systems $\mathrm{P}-1$ expression by macrophages or TE for uni-directional translocation. postsynaptic sites may go undetected ome other protein(s) is unknown.
of pigmentation is currently unknown.
observed in these embryos as well.

In conclusion, this study has revealed In conclusion, HIV-1 attachment to targe In conclusion, this study demonstrates $t$ In conclusion, the present work provides In conclusion, transgenic mice with chro In conclusion we show that the phenotype In conclusion, caM supported T. virens In conclusion, we have shown that o. lam In conclusion, carbohydrate-induced TG In conclusion, our data suggest that str In conclusion, the ensemble of the rece In conclusion, both plasma and lipids fr In conclusion , found that elevations In conclusion, we found that elevations In conclusion, we prevalence of so-cal In conclusion, from the standpoint of th In conclusion, M. xanthus may utilize bo In conclusion, the pathogenesis of HCHWA In conclusion, findings from our studies In conclusion, this work has shown that In conclusion, we identified a region of In conclusion, this study suggests tha In conclusion, although ultrastructura1 In conclusion, replacement of human c-pe In conclusion, there are at least three In conclusion, our data for the first ti In conclusion these results show that wh In conclusion, the establishment of a ra In conclusion, the data demonstrate a ro In conclusion, this study demonstrates $t$ In conclusion, Lp-PLA \# has a significan In conclusion, the ability of the $C / B / B-$ In conclusion, the renal and osmoregu In conclusion, we have shown that the In conclusion, IB is actively imported i In conclusion, endothelial cells possess In conclusion, we have shown that neutro In conclusion, three-dimensional domain In conclusion, MCP-1 is predominantly ex In conclusion, the results presented her In conclusion, we have shown that there In conclusion, we have identified a dist In conclusion, this is the first report In conclusion, several defects are obser

Figure 18 Randomly selected occurrences of the construction in conclusion in the HSC
e) adjective + conclusion

The pattern Adjective + conclusion is exemplified by utterances such as "Inappropriate handling of missing response can produce misleading conclusions". Some adjectives like misleading associated with this pattern are concerned with opinions; in other words, they describe the view that the writer has as regards a given conclusion. These evaluative descriptors (in order of frequency) are the following: important, conflicting, misleading, strong(er), believable, erroneous, interesting, logical, obvious, popular, proper, realistic, significant, surprising, tentative, unequivocal, unexpected, untenable and straightforward.

All these adjectives describe the position of the writer towards the discussed conclusion. However, it must be highlighted that this list is far from exhaustive. The fact that only opinion descriptors collocate with the noun conclusion in the native corpus does not prevent other types of descriptors from combining with it.

Thus, it would not be surprising to consider that other adjectives such as the antonyms of the list above may also be associated with this pattern. In this respect, Hunston and Francis (2000:102) point out that "the lack of corpus evidence does not indicate that the missing occurrences are 'incorrect English". Similarly, Moon (2007b) further argues:
> "However large and representative a corpus, and however sophisticated its tools, some items, or some forms of item, may simply not be found. Yet it is not always clear how to interpret negative evidence. While in some cases it may be reasonable to assert that items do not exist in current English, it is usually preferable to moderate the assertion with hedges such as 'has not been found' or 'is unlikely to occur in'. In general, corpus data shows up tendencies, and powerful observations can be made on the basis of those tendencies; but to recast tendencies as rules would be inappropriate." (Moon 2007b:1049)

Although most adjectives can appear both in attributive and predicative positions, the HSC corpus only shows evaluative adjectives being used attributively and predicatively. It is true, however, that the list of predicative adjectives describing the noun conclusion is fairly limited: consistent, paradoxical, controversial, uncertain, tentative, robust, surprising, premature and unwarranted. The examples below show that they are all subcategorised by intensive verbs (i.e. be, seem and remain) and that they relate to a predicand (conclusion/s) which is Subject of a complex-intransitive construction:

| The last conclusion | is | consistent with that observation. |
| :---: | :---: | :--- |
| The latter conclusion | is | paradoxical. |
| The conclusions | remain | controversial and highly uncertain. |
| This conclusion | is | unwarranted. |
| This conclusion | is | not at all surprising. |
| This conclusion | is | extremely tentative. |
| This conclusion | seems | premature in view of continuing uncertainty |
| SUBJECT | PREDICATOR | PREDICATIVE COMPLEMENT |

Table 8 Predicative adjectives in combination with the abstract noun conclusion

There are also some other attributive adjectives preceding conclusion. They differ from the ones already discussed in the sense that they are relational/classificational/restrictive ${ }^{69}$ and more objective than the former. Here are some examples, with bracketed numbers indicating the overall occurrences in the HSC: similar (9), firm (4), general (3), same (3), two (3), several (2), definite (2), current, different, final, last, latter, main, major, second, long-standing (1 occurrence each).

Finally, a third type of attributive adjectives that appear in combination with conclusion refers to topical/defining adjectives, such as the following: biological (7), molecular (4) and qualitative (2). These adjectives delimit the kind of conclusion that is being described; in other words, they show the subject area or a relationship with the noun described.

The examination of the patterning of the node word conclusion in the HSC has allowed to identify the main traits of its phraseology, namely, being used as an introductory item, in combination with restricted (delexicalised) and free verbs, co-occurring with several prepositions giving rise in some cases to the creation of discourse markers (i.e. in conclusion) and collocating with both attributive and predicative adjectives. Table 9 below summarises the main colligational and collocational patterns of this abstract noun.

[^42]| COLLIGATION | COLLOCATION | SEMANTIC PROSODY | DISCOURSE FUNCTION |
| :---: | :---: | :---: | :---: |
| $\mathrm{NP}_{\mathrm{s}}$ (optional, either preceding or following the node word and in coordination with it) | Summary, future directions, prospects, unresolved issues, speculation. | Introduces a new section, separated from the main body of the discourse by means of a comma. | INTRODUCTORY WORD |
| Verbs (active / passive voice) | RESTRICTED COLLOCATES <br> 1. DRAW <br> 2. LEAD TO <br> 3. REACH <br> 4. MAKE <br> 5. ARRIVE AT <br> 6. COME TO | States a conclusion | PERIPHRASTIC USE DELEXICALISED USE (the Verb becomes a more grammatical verb) |
|  | FREE COLLOCATES <br> Support, confirm, base, justify, reinforce, contradict, produce, limit, explain, disagree with, criticize, accept... | Predicates something about a conclusion | PERIPHRASTIC USE |
| Prepositions (following the node word) |  | States the nature / type of what is being concluded. | Grammaticised use of prepositions; it marks a grammatical function: the complement of a noun. <br> Grammaticised use; it marks the NP that corresponds to the subject of the corresponding clause. |
| Preposition (preceding the node word) | - IN | Introduces a summary | Conjunct, discourse marker, lexical bundle. |
| Adjectives <br> 1. Attributive OPINION adj. EXPLANATORY adj. DEFINING adj. <br> 2. Predicative OPINION adj. | important, conflicting, misleading, strong... <br> firm, similar, general, long standing... <br> biological, molecular, qualitative... <br> paradoxical, controversial, tentative, premature, surprising | Describes the position of the writer towards the discussed conclusion. <br> Explains some characteristics of the discussed conclusion. <br> Defines the type of conclusion. <br> Classifies / describes the position of the writer towards the discussed conclusion. | RELATION |

Table 9 Main colligational and collocational patterns of the abstract noun conclusion found in the HSC

### 4.4 The patterns of the noun agreement

A close look at the grammatical and lexical patterning around the abstract noun agreement reveals that its recurrent phraseologies are associated with particular syntactic and semantic contexts. This noun shows particularly striking features; not only due to the fact that it forms part of many delexicalised structures but also because it seems to have substituted its corresponding verb agree in many fixed expressions, as will be discussed in the following pages.

## a) verb + agreement

The linguistic analysis of agreement in the HSC shows that it often collocates with a verb. Grammatically, these verbs can be divided into two main categories ${ }^{70}$ : restricted (reach, find, lead to, make and be) on the one hand, and free (require, evaluate, test, establish, express, lack, expect), on the other.

The behaviour of this Verb + Noun pattern is strongly reminiscent of the "verb + conc/usion" combination (cf. section 4.3), in the sense that these restricted collocates are often used as delexical verbs. Verbs such as reach, find, lead to and make that collocate with agreement as their Object or Oblique ${ }^{71}$ simply indicate that someone performs an action; that is, someone agrees on/with something/someone. What seems really important is that the literal meaning of these verbs has weakened and has adopted the role of a grammatical prop for the noun (Howarth 1996:113). Therefore, it can be concluded that a certain degree of semantic bleaching ${ }^{72}$ has taken place and, as a result, the noun agreement has gained more semantic weight.

As will be discussed later on, this process of delexicalisation is especially relevant when dealing with abstract nouns. In the case of agreement, for instance, it is obvious that the frequent verbs it collocates with have gradually lost most of their original sense and become part of an extended unit of meaning; that is, the meaning of the whole expression is now distributed "across a number of words" (Sinclair 1987:110). These delexical uses are thus

[^43]seen as figurative extensions from their literal meanings. Table 10 below charts a clear difference between the delexical uses of reach, find, lead to and make and its other literal and/or more conventional uses, which have been provided by the Oxford Collocations Dictionary for Students of English (2002).

|  | DELEXICAL USES | PRIMARY / CONVENTIONAL MEANINGS |
| :--- | :--- | :--- |
| REACH | conclusion, agreement, <br> decision | a peak, a stage, height, weight |
| FIND | conclusion, agreement | a way, species, food, hosts |
| LEAD TO | conclusion, agreement | a place, a cavity |
| MAKE | conclusion, agreement, <br> decision, comparison | a hole, work, extracts, a study |

Table 10 Delexical and primary uses of the verbs reach, find, lead to and make

However, if instead of looking at restricted collocates, one considers the list of free-choice verbs that combine with agreement, striking differences stand out. First and foremost, frequency of use must be taken into account because the general impression seems to be that the wider range of verbs reported, the less frequently they are used. The results are given in Figure 19:


Figure 19 Number of occurrences of restricted and free collocates in combination with the noun agreement

Another remarkable feature lies in the fact that unlike restricted collocates, all instances of free collocates + agreement are used in the active voice. The most frequently used delexicalised verbs (reach, find ${ }^{73}$ ), on the contrary, are much more common in passive constructions, as the HSC examples show:

1. Can any agreement on principle be found?
2. Agreement on normality was found.
3. (...) in successive water samples until agreement was reached to +-1 mmHg for samples with...
4. Despite almost universal use, agreement has not been reached on the need to administrate...

The collocation BE (in) + agreement ${ }^{74}$ has been purposely given a section on its own as it is the most frequently used "V + agreement" collocate and it shows certain particularities that should be further discussed. In a sense, this pattern should be regarded as a restricted collocate since the auxiliary verb "be" does contribute little to the meaning of the whole expression. However, it seems a bit risky to state that this periphrastic use always equals "agree", especially when being used in the past and when the Subject is animate (see examples 12, 14, 16). Semantically, "be in agreement" appears to entail some meaning extension from the action of "agree". The logical sequence would be as follows:


Figure 20 agree vs. be in agreement

[^44]Consider these pairs of examples ${ }^{75}$ :
5. The results from the two methods were in agreement
6. The results from the two methods agreed.

7. Our findings are in agreement with a large body of evidence.
8. Our findings agree with a large body of evidence.

9. These observations are in agreement with the meiotic drive hypothesis.
10. These observations agree with the meiotic drive hypothesis.


## BUT

11. To my great pleasure she also agreed to collaborate in this venture. $\neq$
12. To my great pleasure she was also in agreement to collaborate in this venture
13. Men and women in the study sample agreed to be examined by a geriatrician.

$$
\neq
$$

14. Men and women in the study sample were in agreement to be examined by a geriatrician.
15. All the participants agreed that the workshop approach was valuable.
$\neq$
16. All the participants were in agreement that the workshop approach was valuable.

Taking into account that syntax and semantics are mutually dependant, there seems to be a semantic motivation in the syntactic patterns associated with the construction "be in agreement". The typology of noun phrases performing the syntactic function of Subject is of key importance in the analysis of such a

[^45]periphrastic structure. A careful examination of the following examples is required:

## AGREE

## agree as "accept"

17. It was assumed that all pregnant women offered the test would agree to be tested.
18. Professors agreed to conduct seminars.
19. If you were this patient would you agree to this standard treatment if it added 1 week to your life?
20. JPN agreed the funding for the project.

## agree as "be of same opinion"

21. In sum, we agree with Schullery and Whittlesey.
22. We agree with Dawkins [1980] that the presence of an abnormal behavior...
23. Most biologists agree with the latter authors.
24. They sometimes appear not to agree with each other.

## agree as "tally, coincide, be equivalent"

25. These findings agree with those from the Nuf2p-GFP analysis.
26. The results of both these studies agree with our forecasts.
27. These data agree with a direct binding solid-phase assay.
28. Our results agree with those obtained by Janknecht et al.
29. The models agree with the data qualitatively.

## BE IN AGREEMENT

## be in agreement as "be of same opinion"

30. One researcher from the US and one from Poland are in broad agreement.
31. Foster et al 1988 and Kalderon and Rubin 1988 are in agreement.

## be in agreement as "tally, coincide, be equivalent"

32. These findings are in full agreement with our evidence.
33. These values are in good agreement with electro-physiological estimates.
34. These fluorescence data are in good agreement with observations on R. capsulate.
35. The results from the two methods were in agreement.
36. The MIC data are entirely in agreement with the topological model.
37. These observations are in agreement with earlier findings by our group.

The examples listed above report a clear preference for the periphrastic use (be in agreement) over agree when referring to coincident figures, data, values, etc. (70 occurrences as opposed to 37). Once again, it is worth mentioning that the NPs that perform the syntactic function of Subject of this construction are all related to the same semantic field of quantifiable, evident data.

Regarding the meaning of "be of same opinion", the corpus data show that this sense is less common. Despite this low frequency, the full verb "agree" is more likely to be used. Needless to say that this semantic use requires an animate volitional Subject, so the noun phrases found performing this function are realised by personal pronouns, mainly we and they, and/or proper names.

A third semantic sense traced is related to "accepting something". No instances of this meaning are expressed by means of the periphrastic construction be in agreement. Examples (17-20) cannot be paraphrased as follows:
38. ? It was assumed that all pregnant women offered the test would be in agreement to be tested.
39. ? Professors were in agreement to conduct seminars.
40. ? If you were this patient would you be in agreement to this standard treatment if it added 1 week to your life?
41. ? JPN were in agreement the funding for the project.

The fact that this use of agree in example (20) selects an Object as part of its subcategorisation makes the periphrastic structure in example (41) an unacceptable substitute in this case. The following Figure summarises the polysemy associated with these two expressions:


Figure 21 Semantic connotations of agree vs. be in agreement
Finally, it should be underlined that in comparison with other abstract nouns, agreement is characterised by its semantic load as a noun; in other words, it is more likely to appear in combination with other units (i.e. as a prepositional complement or a predicative complement, and as notional Subject) rather than in combination with either full or delexical verbs. In such cases, though, the noun contributes to a great extent to the meaning of the extended unit of meaning it belongs to.

## b) adjective + agreement

Attention should now be addressed to the modifiers of the abstract noun agreement found in the HSC. There is a wide range of adjectives modifying agreement and most of them ( $96,7 \%$ ) do appear in attributive position. In fact, there are only two instances in the corpus where adjectives modifying this noun are used predicatively:
42. Agreement regarding data abstraction was good.
43. However, agreement between symptoms and signs in people with varicose veins is so poor.

The lexico-grammatical patterning of agreement with reference to its modification is fairly straightforward. The adjectives associated with it on the concordance can be easily grouped into two main semantic domains:
descriptors and classifiers ${ }^{76}$. Descriptors found within this collocational span refer to either the extent of the agreement or the opinion the writer has with respect to a given agreement by denoting judgement and emphasis (evaluative/emotive descriptors). In contrast, classifying adjectives restrict the referent of a given noun (i.e. agreement). Adjectives found under the latter category can be grouped into subclasses, including relational/classificational/restrictive and topical adjectives.

Interestingly, descriptive adjectives stand out as the most frequent modifiers of agreement. The adjective good ( 20 occurrences) has gradually depleted its original qualitative meaning and embraces a new quantitative sense, in the same line as broad, strong, general or its negative counterpart, poor. See some HSC examples:
44. The results were in good agreement.
45. This finding is in general agreement with results reported previously.
46. They are in broad agreement.
47. This possibility is in strong agreement with the proposal that...
48. The poor predictive value of clinical signs and poor agreement between observers are major limitations.

As can be seen in Figure 22, the most frequent adjectives (good, general, strong, close) belong to the most objective category (descriptors of extent), whereas opinion adjectives (evaluative) are not that common. A possible reason to account for this particularity may lie in the fact that nouns being agreed or not are all related to demonstrable data, such as, findings, results, observations, figures and the like. Thus, more neutral adjectives are more likely to collocate with the abstract noun under study.

[^46]

Figure 22 Frequency of occurrence of adjective + agreement collocations in the HSC
c) agreement + preposition

According to Biber (1999:634), "prepositional phrases are by far the most common type of postmodifier in all registers" although they are much more frequent in academic writing. Postmodifying prepositional phrases as dependencies of the abstract noun agreement can be introduced by different prepositions. Thus, it seems essential to examine in pretty much detail the choice of preposition in each case.

Prepositional phrases beginning with among (2 occurrences), between (18 occurrences) and on (6 occurrences) are less common than with (106 occurrences), but all of them are used to represent different semantic relations:

AGREEMENT ON $\rightarrow$ introducing a relationship of respect, that is, the topic of agreement (on the matter of)

HSC examples:

- a general agreement on the need to (...)
- general agreement on the format and criteria
- agreement on normality

AGREEMENT AMONG / BETWEEN $\rightarrow$ establishing common agreement shared by two or more people and/or figures, observations, results, etc.

HSC examples:

- agreement between zookeepers
- perfect agreement between the two methods
- general agreement among evolutionary biologists

AGREEMENT WITH $\rightarrow$ indicating the relationship respect (with respect to, as regards, with reference to)

HSC examples:

- in agreement with previously reported accounts
- in agreement with our hypothesis
(...) agreement with the results obtained

Table 11 Semantic relations expressed by the different prepositions postmodifying agreement
As stated earlier, the use of a with-PP (106 occurrences) postmodifying agreement outnumbers by far the occurrences of on-PPs ( 6 occurrences). Both postmodifiers represent a similar meaning, but the predominance of the former is due to the fact that the expression "in agreement with" is a highly frequent, recurrent sequence in scientific register. Also, the Prepositional complements of
with-PPs may refer to "something or someone", whereas the Prepositional complements of on-PPs only refer to the agreed content ("something").

Regarding the combination "agreement among / between", it should be noted that it tends to be preceded by a fairly recurrent expression, "the level of', which must be interpreted as a lexical bundle; in other words, a sequence of items that occur together as a set. As examples (49-52) show, this 5 -word bundle is open to the addition of an adjective (i.e. high, substantial) and the use of the (in)definite article is optional.
49. The level of agreement between the presence of symptoms and trunk varices is probably too low to be clinically useful.
50. We found significant levels of agreement between keepers.
51. There was a high level of agreement between the two methods.
52. Reasonably high levels of agreement between zookeepers can be accounted for.

Biber (1999:634) points out that in many cases, postmodification by prepositional phrases can be rephrased by means of a relative clause. The abstract noun agreement is hardly postmodified by a relative "that-clause" (only 7 occurrences) in the HSC, but it is true that this structure could replace an onPP without changing its meaning. Compare the examples ${ }^{77}$ below:
53. They lead to a general agreement on the need to re-establish populations.
54. They lead to a general agreement that populations need to be re-established.
55. Resolution of this problem requires agreement on the primitiveness of indirect development in various phyla.
56. Resolution of this problem requires agreement that indirect development is primitive.
d) preposition + agreement

This pattern is realised by the structure in agreement with something, which should be analysed as a lexical bundle that has undergone a remarkable

[^47]process of delexicalisation. Biber (1999:999) states that most lexical bundles do not represent complete structural units. Instead, they span two structural units. This is also the case of in agreement with, which consists of a prepositional phrase (in agreement) + the beginning of another with-prepositional phrase. He also notes that most lexical bundles end in a function word; in this case, the preposition with.

Once again, certain degree of delexicalisation takes place as the noun agreement has lost its original semantic load and now it forms part of an extended unit of meaning. What is more interesting, though, is that this delexicalisation process has given rise to the lexicalisation of a new grammatical structure. Notice that the abstract noun agreement has lost its grammatical category as a noun and has become part of a prepositional phrase semantically equivalent to "equally, likewise, in the same way", corroborating what has already been stated and/or as a further demonstration of what has been found. The following examples show this correspondence:
57. In agreement with these results (=similarly to these results), earlier studies of lac permease have suggested that 31-residue insertions assembly competence.
58. In agreement with this concept (=following this concept), it was recently found that the same mechanism works as well with other sites.
59. In agreement with this observation (=following this observation), the average number of cells per colony on day 10 of culture was 1,400 .

Another feature that reinforces this grammaticalisation is the fact that this construction is separated from the rest of the text by means of a comma and it is not premodified by any other element either. In this collocation the noun agreement forms part of a multiword sequence which shows not only a high degree of semantic unity but a process of grammaticalisation as well. This mechanism involves a transformation process in which lexical items become grammatical forms. Indeed, agreement is not used as a noun anymore but as an element of a complex phrase that functions semantically and syntactically as a whole grammatical unit.

## e) The lexical bundle there is + (adjective) agreement

Last but not least, there is another lexicalised expression that deserves some attention as a lexical bundle characteristic of scientific discourse. Taking into account that "only a few lexical bundles begin clauses in academic prose" (Biber 1999:1023), the fact that 47\% of the occurrences of "there is (adjective) + agreement' begin clauses in the HSC is significant.

This four-word bundle consists of the existential there as a Subject, the copula be (inflected for Present, Past and / or Present Participle), an optional premodifier (general, good, or the comparative more) and the abstract noun agreement as the notional Subject. This type of phrase, referred to as "stance bundle" by Cortes (2004:409), introduces certain degree of impersonality to what is being reported in the research articles under study. Once again a preference for periphrastic structures defines this genre.

### 4.5 The patterns of the noun comparison

As already pointed out, the key notion that lies behind the concept of lexical grammar is that certain patterns occur with restricted lexis (Hunston \& Francis, 2000:96). When identifying the most typical patterns abstract nouns appear in, one easily realises that some words tend to appear in combination with others and this may enable the user of a language to make generalisations about the likelihood of a particular word to occur with a particular pattern in a given context.

However, Hunston and Francis (2000:96) further argue that "it does seem to be the case that speakers of a language sometimes use a word with a pattern it does not typically have." Therefore, it should be speculated that when a given pattern consists of words associated with a particular meaning, speakers, by a process of analogy, tend to use similar words with that same meaning, so "what words belong to a list is in a state of flux" (ibid.) Several examples of this stated analogy can be detected in the patterns found with the abstract noun comparison in the HSC.

The first striking trait of this abstract noun refers to its frequency. Both the noun and its corresponding cognate verb, compare, are frequently used in the corpus (1196 and 2296 occurrences, respectively). While it is recognised that frequency counts are not the only reliable source of information with regard to pattern description, it is nonetheless clear that frequency is an important factor to validate generalisations made from corpus data. The next section will explore the patterns associated with the abstract noun comparison so as to present a comprehensive description of its main senses and uses.

## a) verb + comparison

Once again, the verbs listed as having this pattern fall into two main categories: restricted collocates* that equal the meaning of compare (make / perform / draw / establish / do / undertake / accomplish / conduct / carry out a comparison) and free collocates. The latter constitutes a long list of verbs but, as stated with the free collocates of the noun agreement, their frequency is rather low in comparison with restricted collocates.

The most common verb in combination with comparison is make ( 28 occurrences). There are other verbs (i.e. perform, use, accomplish) that show a much smaller number of occurrences, but might have been used by a process of analogy, since they are synonyms of make and share the same core meaning of "create, produce".

Following the idea that patterns and meanings are closely related, it is worth mentioning that not only do these verbs share a similar meaning when combining with comparison but also share a similar syntax. With the only exception of draw, the other verbs including make show a syntactic preference for passive structures, as data in Figure 23 demonstrate:


Figure 23 Collocational patterns of the noun comparison

Delexicalisation seems to be a commonplace when verbs that occur with abstract nouns equal the meaning of the noun's corresponding verb. Comparison is not an exception to this rule. These restricted verbs have lost their primary meanings and the abstract noun provides the semantic content to the whole unit.

Free collocates, on the contrary, outnumber restricted ones despite being much less frequently used. It would even be possible, by analogy, to enlarge that list with some other verbs such as invite, bear, stand, analyse, value, etc. Such limited occurrences (most of them are realised only once in the corpus) are not sufficient to conclude that they constitute representative collocations. On the other side of the coin, however, some other verbs similar in meaning to these free collocates could have also been used without altering the meaning of the pattern. These free verbs can be grouped semantically as follows:


## $\square$ "Faciliting" Verbs $\square$ Verbs of Analysis Verbs expressing source $\square$ "Considering" Verbs $\square$ Others

Figure 24 Semantic fields of free collocates of the type $\mathbf{V}+$ comparison

In regard to the syntactic environment these collocates appear in, Figure 23 shows that, unlike restricted collocates, these verbs are mainly used in active constructions. Particularly noticeable as well as frequent enough is the group that embraces "facilitating" verbs, such as allow, permit, enable, facilitate. Here are some illustrating examples:

1. Our two estimates are based on the same two calibration dates to allow direct comparisons to previous results.
2. This has allowed inter-specific and inter-gender comparisons.
3. To allow comparison of the relative merits of alternative options we (...)
4. This enabled a more direct comparison with previous analyses that used such methods.
5. Use of bin assignments enables comparison among different maize mapping populations.
6. We chose these particular values because they facilitate comparison with Table 1.
7. The present study was conducted to permit comparison of serum $25(\mathrm{OH}) \mathrm{D}$ concentrations.

To sum up, it must be indicated that not all delexical verbs that form part of restricted collocates show the same degree of delexicalisation. Comparing the examples (8-11) below, one realises that the verbs undertake and carry out still keep some semantic content in comparison with make and draw. Nevertheless, the syntactic environment of all these periphrastic structures has proven to be identical and all of them could also be substituted by the full verb compare.
8. The following series of comparisons were undertaken for each parasitoid species.
9. Pairwise comparisons were made using a paired $t$ test.
10. In order to draw comparisons between the active site of calpain and those in other cysteine proteases...
11. Our comparisons were carried out on a uniform genetic background.

## b) adjective + comparison

There are two important points to be made about this pattern: the noun comparison may be followed by a prepositional phrase beginning with of, and both descriptors and classifiers can be found modifying the abstract noun comparison.

```
DESCRIPTORS
valid (5): EVALUATIVE
reliable (3): EVALUATIVE
sensitive (1): EVALUATIVE
relevant (1) : EVALUATIVE
significant (1): EVALUATIVE
realistic (1): EVALUATIVE
careful (3): DESCRIPTIVE
recent (1): TIME
```

Table 12 Classification of modifiers of the abstract noun comparison (number of occurrences in the HSC)

## EVALUATIVE DESCRIPTORS



Figure 25 Distribution of evaluative premodifiers of the abstract noun comparison

## TIME / DESCRIPTIVE DESCRIPTORS



Figure 26 Distribution of time/descriptive premodifiers of the abstract noun comparison


Figure 27 Distribution of relational premodifiers of the abstract noun comparison

## TOPICAL CLASSIFIERS



Figure 28 Distribution of topical premodifiers of the abstract noun comparison
As Figures 25-28 reveal, classifiers are much more common than descriptors. Most classifiers delimit the referent of comparison, whereas descriptors, such as relevant, reliable and valid, provide more subjective information concerning the suitability of the comparison made. This fact goes in line with Biber's et al. findings (1999:514), as they state that academic prose is characterised by its high use of classifiers, mainly relational and topical adjectives. Among the most frequent premodifiers of the abstract noun comparison, the relational adjective direct and the topical classifier statistical stand out as the most frequently used. In addition to showing a heavy reliance on relational adjectives, another notable feature of this pattern is that these adjectives appear in an attributive position, preceding, thus, the head noun comparison.

As will be discussed with much more detail when describing the pattern comparison + preposition, noun phrases in academic writing tend to have some kind of modifier. Consider the following HSC instances:
12. This theoretical argument is backed up by a careful comparison of the spectra of spontaneous (...)
13. In our recent study a direct comparison between both procedures was performed.
14. Eggplant in open plots did not produce any fruit, and thus no statistical comparison is needed.

The above examples are just a random selection of entries from the HSC, but the conclusion to be drawn from the examination of all occurrences (1196) is that the noun comparison always appears modified by premodifiers, usually adjective phrases, and/or postmodifiers (prepositional phrases). It is also frequent to find both kinds of modifiers in the same example. This finding should be taken very much into account because once again syntax is in the service of meaning. Needless to say that utterances such as "several comparisons were made" and "this system can provide reliable comparisons of the relative amounts of RNA present at a given time" differ to a great extent in the amount of information provided by modifiers.

In the former example, the lack of a longer context does not allow to infer what kinds of comparisons are being dealt with. Premodifiers, then, without the support of a postmodifier are seen as less explicit in helping identify the semantic relationship that exists between the modifier and the noun. The latter example, on the contrary, is much more specific as the abstract noun, comparison, is premodified by a semantically-driven adjective (reliable) and postmodified by an of-PP giving information about the compared data. Consequently, semantic motivations are more easily found in this type of pattern.

## c) comparison + preposition

Most instances of the abstract noun comparison are postmodified by means of a prepositional phrase, which suggests that this combination of words occurs frequently. When investigating the different patterns of a word with the assistance of a concordancing program, one may be interested in sorting them into alphabetical order to the right or to the left. In the case of nouns and, especially, when the focus of attention lies in their complementation patterns, it seems advisable to sort them to the right. The following concordance lines taken from WordSmith Tools ${ }^{78}$ have been sorted to the right and show some randomly selected postmodifiers of comparison.

```
WordSmith Tools -- 07/05/2008 17:35:28
298 ogous markers also allowed for a direct comparison of the rate of meiotic rec
299 1998 in mosquitoes. In the recent comparison of Arabidopsis and B. nigra,
300 643-651.[Medline] Nuovo, G.J. 1991. Comparison of bouin solution and buffer
3 0 1 ~ i s ~ j u s t ~ o u t ~ o f ~ v i e w . ~ C o m p a r i s o n ~ o f ~ t h e ~ i s o m o r p h o u s ~ c r y s t a l ~ s
302 hard et al., 1997; Lin et al., 1997). Comparison of the crystal structures of
3 0 3 ~ e d ~ w i t h ~ g r e y ~ s h a d i n g . ~ ( B ) ~ C o m p a r i s o n ~ o f ~ p u t a t i v e ~ C K I ~ m o t i f s ~ w i t h i
304 fected cells are compared in Figure 3B. Comparison of the steady-state level
305 tney U test was applied for pair-wise comparison of the data. Intracellular
306 P65 and GRASP55-GFP to allow a direct comparison of the distributions of thes
307 ity observed for homologous proteins. Comparison of the HMG-D-DNA structure w
3 0 8 ~ t e ~ c o m p l e x ~ i n ~ t h e ~ E . c o l i ~ M a l P ~ e n z y m e . ~ C o m p a r i s o n ~ o f ~ t h e ~ b i n a r y ~ c o m p l e x e s ~ w i t h ~
309 l basis of HMG domain specificity The comparison of the bound HMG-D protein w
310 degradation. (A) Sequence comparison of the first 26 residues of
311 proteases (Kamphuis et al., 1984)]. (B) Comparison of the D-IV-D-VI heterodimer
312 terminal extension (Nagy et al., 1998). Comparison of the template-sized and
313 rows indicate a hypothetical route. Comparison of histone H3/HMG-14 kinase
314 375\pm386 (Printed in Great Britain) 375 Comparison of the fibrin- binding activ
315 ange in a1. Fig. 9. Comparison of the exposed surface of th
316 horImager. Statistics For comparison of differences between more
3 1 7 \text { d reversed by unlabelled 14.4 kDa FBP. Comparison of the fibrin-binding affini}
318 or 'T', respectively. (E) Comparison of the core metal-binding fo
319 ns of these two proteins (Figure 4E). Comparison of the two images shows that
320 act of SPW3 (Fig. 6B). Interestingly, comparison of the total exoprotein prof
321 is. To permit an accurate and sensitive comparison of the effect of the wild-
322 NA, thus allowing direct and reliable comparison of the activities of the nat
323 gm for how the LTTR family operate. A comparison of residues conserved, in te
324 FP fluorescence visualized (Figure 4D). Comparison of the individual staining
Fig. 1. Comparison of the GRASP55 and GRASP65 s
    strates (Suzuki and Sorimachi, 1998). Comparison of the active site and subst
    (results not shown). For further comparison of binding of HNF-3a and HNF
    ournal Vol. 18, pp. 1598-1608, 1999 A comparison of in vivo and in vitro DNA-
    x H12 that protrude from the monomer. Comparison of amino acid sequences indi
    Table I Comparison of mRNA half-lives (min) bet
    ls to the majority of genes. Based on a comparison of in vitro and in vivo DNA-
```

Figure 29 Concordance lines to the node word comparison
It has been previously mentioned that there are 1196 entries of comparison in the HSC, out of which 756 occurrences are explicitly postmodified by means of a prepositional phrase introduced by a wide range of prepositions, namely, of, between, to and with. Such prepositions are not content words on their own;

[^48]they are just function words that must necessarily be semantically-motivated. Figure 30 below gives account of the frequency of occurrence of each preposition in this pattern.


Figure 30 Prepositions following the noun comparison

What seems of vital importance is to analyse the noun phrases performing the syntactic function of Prepositional complement. As a first step, a representative sample of occurrences of each preposition following comparison will now be examined.

```
comparison + OF
N Concordance
```

1. Figure 1. Comparison of population growth for simulated population of pea
2. Table 1. Comparison of ELP scores for trainees attending the JWPT training
3. Berk, and B.P. Alter (1989) Comparison of erythroid progenitor cell growth in
4. et al., 1997; Lin et al., 1997). Comparison of the crystal structures of the
5. Figure 2. Comparison of relative frequency of total T cells and the CD4 and
6. transfer of endogenous Fig. 3. Comparison of decalcification procedures on
7. visualized (Figure 4D). Comparison of the individual staining patterns
8. both "subspecies." A comparison of frequencies of behaviors between the 9. a factor of three or more, a comparison of the results of the different methods
9. a comparison of treatment means (Table 2 ) by LSD test ( $\mathrm{P}, 0.05$ ) revealed...
```
comparison +BETWEEN / comparison +AMONG
N
    Concordance
1. Values are mean }\pm\mathrm{ SEM. *P < 0.05, comparison between dietary treatments.
2. a new window] Table 4. Comparison between children involved in road traffic
3. treated with caterpillar regurgitate. A comparison between the odors showed
4. comparison between patients with the acquired immunodeficiency syndrome
5. and fusions, direct comparison between rice and maize is facilitated by
6. Use of bin assignments enables comparison among different maize mapping
comparison + WITH
N Concordance
1. on estimates of nutrient composition and comparison with NRC guidelines for
2. cortisol levels from eland might serve as the best comparison with bongo.
3. Iymphoma in the higher exposure categories. Comparison with other studies
4. Comparison with the thrombin receptor. J. Biol. Chem. 271:14910-14915.
5.This enabled a more direct comparison with previous analyses that used
6. To facilitate comparison with other studies, we used a Gaussian function for
comparison +TO
N Concordance
1. same two calibration dates to allow direct comparisons to previous results.
2. were determined by comparisons to a methylene blue-stained, 0.24- to
3. in origin, at least on the basis of comparisons to the proteobacterial genomes
```

Table 13 Random selection of right-sorted concordance lines of the pattern comparison + preposition

According to the above examples, the preposition of has revealed itself as the most common following the noun comparison. Without the intention of minimizing its frequency rates, it should be noted though that its high frequency is partly due to the fact that the structure "comparison of" tends to form part of the description of tables and figures in research articles, so, in a sense, some of these occurrences have not been taken from the body of the articles, but from the captions of such figures ${ }^{79}$, as the ones shown below:

[^49]15. Table 1. Comparison of cowpea and soybean ferritin subunits for mature proteins shows (...)
16. Figure 2. Comparison of relative frequency of total T cells.
17. Experiment 3: Comparison of Grasses to Nongrass plants.
18. Table 4. Comparison of effect on mortality of different drugs.

Noun phrases that perform the function of Prepositional complements can be semantically interpreted as noun phrases that form part of the same semantic field (i.e. genes, populations, frequencies, procedures, structures, images, responses, results, patterns, treatments, measures, data, values, stages, doses, studies and other quantifiable data.)

Similarly, the prepositions between and among, the latter being much less frequently used, introduce Prepositional complements that postmodify the noun comparison as well. So as to illustrate that the prepositions are just function words that carry little, if any, semantic load, the following examples show there is no semantic difference between these five prepositions as they select identical noun phrases.
19. Comparisons among these genes have begun to reveal some common features.
20. (...) comparative genomics, for most people, immediately brings to mind the study of the comparison of human disease genes.
21. It is difficult to make meaningful antibody titer comparisons among studies without standardization of the assay.
22. Our comparison of studies that manipulated vertebrate herbivores contradict these earlier, rather anecdotal reviews.
23. To facilitate comparison with other studies, we used a Gaussian function.
24. Comparisons among species at several institutions can illustrate differences.
25. Only one comparison of each species was conducted with N viridula.
26. Comparison with closely related species without the duplications
27. Although limited to comparisons between the three most acceptable plant species, did not indicate (...)
28. Initial observations and comparison to preclinical models
29. Comparison of the migration models reveals (...)

Even though it has been proved that between/among on the one hand, and of, on the other, can be equally interchangeable, there seems to be a preference for the use of among when the Prepositional complement refers to members of a group, species, companies, animals, etc.
d) preposition + comparison

Following Sinclair's idiom principle in that writers can use "a large number of semi-preconstructed phrases that constitute single choices, even though they might appear to be analyzable into segments" (Sinclair, 1991:110), evidence for formulaic expressions of the type preposition + comparison + preposition is also noticeable from the analysis of the scientific texts under discussion.

In their study of lexical bundles, Biber et al. (1999) define them as "recurrent expressions, regardless of their idiomacity and regardless of their structural status" (1999:990); that is, they refer to simple strings of words that usually collocate in natural language production. In general, occurrences of such word strings are frequent in the HSC. Writers of scientific articles make use of lexical bundles of the form as / in / by / for comparison (of / with / to) when establishing a comparison. The bundles identified within this pattern present a straightforward grammatical grouping. In fact, Table 14 shows they are all parts of prepositional phrases (e.g. in comparison with, for comparison of).

| IN COMPARISON(,) | N. of occurrences |
| :--- | ---: |
| in comparison with | 18 |
| in a comparison with | 46 |
| in comparison to | 1 |
| in comparison of | 30 |
| in a comparison of | 1 |
| FOR COMPARISON(,) | 3 |
| for comparison of | 21 |
| for comparison with | 10 |
| BY COMPARISON(,) | 7 |
| by comparison with | 19 |
| by comparison to | 19 |
| as a comparison | 14 |

Table 14 List of 2, 3 and 4-word lexical bundles with the structure preposition + noun phrase fragment (comparison)

As can be seen in the Table above, the sequences in comparison with/to, for comparison and by comparison with are the most frequently used in the corpus. The most common prepositions introducing these structures are in, for and by, which are intended to indicate different functions. Table 15 below summarises the discourse functions performed by these lexical bundles.

| GRAMMATICAL <br> GROUP | FUNCTION |  | EXAMPLES |
| :--- | :--- | :--- | :--- |

Table 15 Discourse functions of the pattern preposition + comparison
In the case of the preposition in, for instance, sequences simply introducing a comparison can be found. It is also worth highlighting that, as discussed in the description of the pattern comparison + preposition, the choice of the
preposition with / to postmodifying the unit in comparison does not entail any semantic change. Compare the following examples:
30. Worms at greater than $10^{\circ} \mathrm{C}$ in the laboratory results in high mortality rates in comparison to worms maintained at $10^{\circ} \mathrm{C}$ or below.
31. The overhead costs are also small in comparison with those of more developed regions.

The other prepositional phrases present varied meanings such as, FORPrepositional phrases, which indicate the purpose of an action (e.g. "For comparison of differences between more that two means, data were subjected to analysis of variance"), BY-Prepositional phrases that express the means by which an action is performed (e.g. "Efficiency of bacterial lysis was measured by comparison of the bacterial concentration before and after lysis"), and ASPrepositional phrases, hardly used, which express merely a comparison (e.g. "As a comparison, we also did the calculations for a 10-kDsignal"). See Figures 31-34 below:


Figure 31 Overall number of occurrences of the pattern preposition + comparison (lexical bundles)


Figure 32 Realisations of the lexical bundle in comparison


Figure 33 Realisations of the lexical bundle for comparison


Figure 34 Realisations of the lexical bundle by comparison

Among all these lexical bundles, the most interesting ones seem to be in comparison, for comparison and by comparison when not being postmodified by any prepositional phrase. They can be interpreted as slightly different from postmodified structures since they appear to be more grammaticalised. These language chunks must be seen as whole units of meaning. The abstract noun comparison has lost part of its function as a noun (decategorialization) and has adopted along with the preposition it collocates with a more grammatical role as a conjunct that is intended to link two utterances or parts of it in the discourse.

When writing scientific papers, scientists are prone to make high use of these structures in order to organise their discourse, so it seems essential to study them more thoroughly. According to Hopper \& Traugott (1993:106), "the more frequently a form occurs in texts, the more grammatical it is assumed to be". Consequently, the frequency of appearance of these three structures also contributes to reinforce the argument that they constitute extended units of meaning that function as linking adverbials. It should also be noted that these
sequences do appear separated from the rest of the text by means of a comma, underlining even more their category as a multiword unit.

Finally, the position of these units in the discourse must be taken into account as well since their distribution may entail certain semantic connotations. Evidence from the HSC reveals a common preference for in comparison and by comparison to be used in initial position, which can thus be considered the unmarked (expected) distribution for these two linking adverbials. On the contrary, for comparison shows an almost identical number of occurrences both in initial ( 21 entries) and final position ( 23 entries). Whilst its initial placement highlights its role as a linking adverbial and marks its connection to the previous discourse, final placement makes this role almost unnoticed.


Table 16 Context distribution of the in comparison bundle in the HSC

| BY COMPARISON |  | Numbe | f occurrences | Context |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Initial | 19 | followed by a comma |
|  |  | Medial | 1 | following a semicolon |
|  |  | Final | - |  |
| HSC examples: |  |  |  |  |
|  | The lack of specific red fluorescence is shown for the same field in (D). By comparison, in (E) and (F), cells were treated in a similar way except that they were permeabilized before treatment with rabbit anti-GFP. |  |  |  |
| 2. | In these con 12 hpi; by larvae inocu | insects, parison, d with a | $Z$ signaling was signals were ilar dose, but at | d at 14 and 16 hpi, but not at at 4 hpi in the M2R-treated acZ was evident. |

Table 17 Context distribution of the by comparison bundle in the HSC

|  | Number of occurrences | Context <br> FOR COMPARISON <br>  <br>  <br> Initial <br> Medial$\quad 21$ | fowed by a comma <br> between commas; <br> immediately following the <br> exclusive coordinator "or" |
| :--- | :--- | :---: | :--- |
|  | Final | 23 |  |

HSC examples:

1. Two of the motifs of the insulin response sequence (IRS, [10]) are shown by open boxes. For comparison, the sites of the mutations introduced into the vector CRE2mut are also shown, with the mutated bases underlined.
2. To test whether dAPC2 directly interacts with Arm, we used the yeast twohybrid system (Figure 2 E ), examining whether dAPC2's 15 and 20 amino acid repeats interact with the full set of Arm repeats of Arm (R1-13), or with the centralmost Arm repeats (R3-8; the binding site for Drosophila E-cadherin and dTCF). For comparison, we tested the 15 and 20 amino acid repeats of dAPC (Hayashi et al. 1997).
3. In these samples, the total amount of insect cell lysate was kept constant to ensure that changes in apparent molecular mass arose from interactions among CBF3 proteins and not as a consequence of binding to contaminating insect proteins. (...) Elution profile of p64 activity from a column to which a mixture of extracts from cells coexpressing p23Skp1 and p58 and cells expressing p64 (solid line) or, for comparison, extract containing only p64 (dotted line), was applied. (c) Elution profile of p58 activity from a column to which extract containing p23Skp1, p58, and p110 (solid line) or, for comparison, extract containing p23Skp1 and p58 only (dotted line), was applied.
4. The residues of the S.cerevisiae 2 tail shown in bold are those that interact with the surface of the a1 hd. The corresponding residues in the other two tails are also shown in bold for comparison.
5. However, no data as to the effects of brachial arterial infusion of adenosine on forearm NAR are available for comparison.
6. Few other studies have examined the socioeconomic gradient in mortality in diabetic people,6 78 and none has included a non-diabetic population for comparison.

Table 18 Context distribution of the for comparison bundle in the HSC

### 4.6 The patterns of the noun contribution

Unlike conclusion, agreement and decision, the noun contribution shows fewer entries (249), whereas its corresponding verb, contribute (to) is more overtly used in the HSC. A careful examination of the morphology of the noun contribution indicates that this is a countable noun used to refer to an abstraction. In Biber's et al. (1999) view, "countability is not a simple reflection of things observed in the external world (...) with reference to discrete concrete objects, but also to abstractions which do not so obviously or naturally come as distinct entities." (1999:242)

Taking into account that an obvious feature of countable nouns is their variation in number, the abstract noun contribution must be regarded as a fully countable
entity. Grammatically, the noun contribution is characterised by number variation (i.e. it inflects for the plural) and its co-occurrence with determiners, mainly central determiners: definite and indefinite articles, demonstrative and possessive determiners. However, it should be mentioned that this noun shows a preference for its base form (166 occurrences) over its inflected counterpart, contributions (83 occurrences). The next sections will focus on the different patterns this noun collocates with.
a) verb + contribution (to)

Amongst the various verbs combining with this abstract noun, there is a limited group of verbs that stand out as being semantically equivalent to contribute. This group of restricted collocates consists of the following verbs: make, provide and produce. Consider some examples ${ }^{80}$ :

1a. Bruce Weir has made many important contributions to population genetic inference theory.
1b. Bruce Weir contributed to population genetic inference theory.

2a. This book should make a significant contribution to the reemergence of the field.

2 b . This book should contribute significantly to the reemergence of the field.

3a. Embryos were organized like cellular jigsaw puzzles, each cell of which was prespecified to produce its own precisely delimited contribution to the mosaic that was the developing organism.
3b. Embryos were organized like cellular jigsaw puzzles, each cell of which was prespecified to contribute to the mosaic that was the developing organism.

4a. It provides only marginal contributions to binding as judged by inhibition studies.

4b. It contributes marginally to binding as judged by inhibition studies.

[^50]5a. These multivitamins did not appear to provide significant contributions to the parameters stated.

5b. These multivitamins did not appear to contribute significantly to the parameters stated.

As can be seen in the examples above, the periphrastic structures of the type "V+ contribution" equal the verb contribute, given the fact that they convey the same meaning. In this respect, it is particularly relevant the fact that make, provide and produce have undergone a process of delexicalisation, by which they have gradually lost their primary sense of "making, creating something" in favour of the meaning provided by the abstract noun they collocate with.

From a semantic point of view, there arise two key questions which this analysis attempts to answer: what do the periphrastic structures make a contribution to, provide a contribution to, produce a contribution to mean? Are they as polysemic as their equivalent, contribute to? The answers to these two questions are of central importance as one of the main fundamentals lying behind pattern grammar is that the meaning of one of the items in a collocation is tied to its co-occurrence with the other item. Thus, for instance, the meaning of make in "make a contribution to" is semantically constrained by the collocation it occurs with.

Likewise, the full verb contribute to is highly polysemic in general English. WordNet ${ }^{\beta 1}$ identifies four different senses of such a verb: 1) bestow a quality on; 2) provide money, time, knowledge, assistance, etc. along with others to a common supply, fund, etc.; 3) be conducive to and 4) contribute to some cause -for instance, furnish works for publication (cf. Figure 35 below):

[^51]```
File History Options Help
Search Word: contribute
Searches for contribute: Verb
The verb contribute has 4 senses (first 4 from tagged texts)
(31) lend, impart, bestow, contribute, add, bring -- (bestow a quality on; "Her presence lends a certain cachet to the company"; "The music added a lot to the play"; "She
brings a special atmosphere to our meetings"; "This adds a light note to the program")
3. (13) contribute, lead, conduce -- (be conducive to; "The use of computers in the classroom lead to better writing")
4. (3) put up, contribute -- (provide; "The city has to put up half the required amount")
Overview of contribute
```

Figure 35 Overview of the node word contribute extracted from WordNet 2.1
On the contrary, the occurrences of both contribute to and "V + contribution to" found in the HSC show a narrower field of use. All the examples refer to a more figurative sense of "contribute ~ contribution" rather than being associated with money, time and the like. A possible paraphrase of these units in the HSC could be "play a significant part / help cause something".

As mentioned in the characterisation of the patterns of conclusion, agreement and comparison, with the above sense of "play a significant role", the restricted collocates of the type $\boldsymbol{V}+$ contribution to and its related cognate verb contribute to are semantically interchangeable. This fact goes reasonably well with the phenomenon of delexicalisation observed in the verbs make, provide and produce, since the meaning of "playing a significant part" is mainly conveyed by the abstract noun contribution in these periphrastic structures and by the verb contribute to in synthetic uses.

Moving now on to syntax, there are a few points that should be considered as well. It has been long acknowledged that in scientific writing, writers often make use of the passive voice in order to avoid the recurrent repetition of personal references (i.e., I / my / me; we / our / us) and to make the text look more
impersonal, neutral and objective (Swales 1990; Biber et al. 1998/1999; Hyland 2008). This syntactic feature (form) contributes to a great extent to placing the emphasis of a given message on processes and experimental procedures (meaning), which is a widely used device in academic writing.

The use of make a contribution, however, differs from what has been stated above. With a total of 25 occurrences in the corpus, there has only been found one instance of this sequence in the passive:
"First, mediastinal tissue analysis of AIDS patients from autopsy revealed that five of seven (71\%) patients had either no thymus or no areas of thymopoiesis, demonstrating that no contribution to the peripheral T-cell pool was being made by the thymus (...)"

Such a preference for active constructions seems to be semantically motivated. The sense of this pattern, which could be paraphrased as "X plays an important part in $Y$ " requires an explicit specification of the Agent (i.e., the maker / causer of the action described); it can, by no means, demote the Subject because it represents an important focus of attention. Below are some examples that illustrate the gist of this argument:
6. This amplification makes too small a contribution to the total amount of lac DNA to be detected by (...)
7. The challenge for the future will be to determine not simply that such altered cell biology could have an effect but that their effects are large enough to make a significant contribution to age-related changes.
8. Additional transcripts of abundance class D make the largest and decisive contribution to the colon-cancer phenotype.

Last but not least, notice that in the only example of make a contribution in the passive found in the corpus (see Figure 36 below), the prepositional phrase (AGENT "by"-PP) of passive sentences has not been omitted ("[...] by the thymus") Again this underlines the fact that this typically optional element in passive sentences is considered to be relevant in this case.

## RESTRICTED COLLOCATES



Figure 36 Active and passive constructions with the pattern restricted verb + contribution

In sharp contrast, there is a wide group of verbs that combine with contribution but do not equal semantically the verb contribute. Most of these free collocates only appear once in the HSC (see Figure 37 and Table 19 below for frequency rates), but they are used to convey a really wide range of meanings.

## FREE COLLOCATES



| $\square V E R B S ~ A$ |
| :--- |
| $\square V E R B S ~ B ~$ |
| $\square V E R B S ~ C ~$ |
| $\square E X C L U D E$ |
| ■DEMONSTRATE |
| $\square$ ASSESS |
| $\square D E T E R M I N E ~$ |

Figure 37 Active and passive constructions with the pattern free verb + contribution

| VERBS A (1 occurrence) | VERBS B (2 occurrences) | VERBS C (3 occurrences) |
| :--- | :--- | :--- |
| CONSIDER | SUGGEST | EXAMINE |
| ELIMINATE | INDICATE | EVALUATE |
| SHED LIGHT ON | MODEL | INVESTIGATE |
| SUSTAIN | ESTIMATE |  |
| REFLECT | DISSECT (OUT) |  |
| SCORE | ENABLE |  |
| QUANTIFY | LIMIT |  |
| APPRAISE | TEST |  |
| OVERLOOK |  |  |
| DISCERN |  |  |
| DISCUSS |  |  |
| ELUCIDATE |  |  |
| DEFINE |  |  |
| REVEAL |  |  |
| ACKNOWLEDGE |  |  |
| DISENTANGLE |  |  |
| MINIMIZE |  |  |

Table 19 Frequency rates of the pattern free V + contribution

Especially noticeable is the use of active structures (i.e. only the verbs exclude and assess are used once in the passive voice) as well as a common preference for verbs connected with scientific procedures: assess, demonstrate, determine, examine, evaluate, investigate, etc.

For the present study, these free collocates have been grouped into different semantic fields, consisting of similar verbs that convey similar meanings and, consequently, can be encompassed under the same category. From the very beginning, all these semantic fields seem to follow a logical line of thought that can be summed up as follows:

1) $X$ makes a contribution to $Y$.
2) $\quad Z$ examines that contribution of / to something.
3) $\quad Z$ evaluates that contribution of / to something.

4) Z excludes that contribution
of / to something

5) $Z$ appraises that contribution of / to something.

Such a sequence of actions can be expressed by a variety of verbs and described as part of a logical sequence of events, as illustrated in Figure 38:


Figure 38 Restricted and free collocates of the pattern $\mathbf{V}_{+}$contribution grouped into semantic fields and described as part of a logical sequence of events

## b) adjective + contribution

There is a wide range of attributive adjectives occurring to the left of the abstract noun contribution. Although both descriptors and classifiers can be found as modifiers of contribution, the descriptors are outnumbered by the relational and topical classifiers (see Table 20 for frequency counts of modifiers of this noun). As for the former, there are adjectives covering the semantic domains of size, quantity and extent (small, minor, minimal, heavy, lower, massive), time (new, early) and evaluation (outstanding, biased, decisive, favorable, functional, sympathetic).

| ADJECTIVES + contribution |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| DESCRIPTORS |  |  |  | CLASSIFIERS |  |
| EVALUATIVE <br> SIGNIFICANT (10) <br> IMPORTANT (7) <br> SUBSTANTIAL (3) <br> OUTSTANDING <br> BIASED <br> FAVORABLE <br> SYMPATHETIC | $$ | $\begin{aligned} & \text { EXTENT } \\ & \hline \text { MINIMAL } \\ & \text { HEAVY } \\ & \text { LOWER } \end{aligned}$ | $\begin{aligned} & \text { TIME } \\ & \text { NEW } \\ & \text { EARLY } \end{aligned}$ | RELATIONAL <br> RELATIVE (23) <br> FUNCTIONAL (4) <br> MATERNAL (4) <br> PARTICULAR (3) <br> FRACTIONAL (2) <br> INDIVIDUAL (2) <br> SPECIFIC (2) <br> UNEQUAL (2) <br> UNIQUE <br> OVERALL <br> ADDITIONAL <br> DELIMITED <br> DETECTABLE <br> DIFFERENTIAL <br> EXCLUSIVE <br> INDEPENDENT <br> INTRINSIC <br> QUANTITATIVE <br> SECONDARY <br> SIMILAR <br> SEPARATE | $\begin{aligned} & \hline \text { TOPICAL } \\ & \text { CALORII (2) } \\ & \text { TECHNICAL } \\ & \text { BIOLOGICAL } \\ & \text { PHYSIOLOGIC } \\ & \text { PLACODAL } \\ & \text { CELLULAR } \\ & \text { NUTRIENT } \\ & \text { GENETIC } \end{aligned}$ |

Table 20 Frequency rates of descriptors and classifiers + contribution
Although descriptive adjectives do not usually collocate with the noun contribution, it should be highlighted that the list of descriptors seems to be limited to the constraints of the genre in question. Scientific writing appears to rely more on relational/classifying (relative, functional, materna); affiliative (African) and topical adjectives (technical, physiologic, caloric, cellular, nutrient, genetic).

This phenomenon is what could be referred to as "stylistic preference"; the most common adjectives in this type of genre are classifiers because academic writing is concerned with delimiting, defining, classifying and focusing on demonstrable data rather than on making judgements or personal evaluations, which tend to be more common of fiction and literary writing.

It is wellknown that many adjectives by a process of derivational affixation become adverbs by suffixing -ly to the base form of an adjective. This universal truth in grammar plays an important part when analysing the most frequent adjectives in combination with contribution: significant, substantial, important. Examining the environment of the verb contribute in the HSC shows that it usually collocates with adverbs derived from the most common adjectives combining with contribution: significantly, substantially, importantly.

The following concordance lines extracted from WordSmith Tools show enlightening examples for significant contribution and contribute significantly in context:

```
WordSmith Tools -- 07/05/2008 17:42:26
133 et al., E89). To evaluate the relative contribution of embryonic gene transcr
134 T. Menes, and E. Hanski (1997) Relative contributions of hyaluronic aci
135 es and an assessment of their relative contributions. The success of these te
136 "selective adhesionö makes a secondary contribution: "In consequence of direc
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
```

Figure 39 Concordance lines of the node word contribution

```
WordSmith Tools -- 07/05/2008 17:49:39
N Concordance
686 zed in the cytoplasm and can ultimately contribute to nonproductive folding. E.
686 zed in the cytoplasm and can ultimately contribute to nonproductive folding. E.
688
8
690
691
62
6 9 3
6
694
695
696
6
698
99
69
700
7 0 1
01
702
703
704
704
7 0 5
706
707
708
709
710
7 1 0
7 1 1
712
7 1 3
714
se the 26 blocks identified undoubtedly contribute to several different compo
emerged as a factor that might uniquely contribute to the elevated levels of R
rmine which of the remaining variables contributed to explaining variance amon
    the functional onset of vision,(41,42) contribute to the subsequent maturatio
plication in B cells could in some way contribute to distinct replication-link
ges in levels of this hormone may well contribute to olfactory imprinting. On
and less than 10 kDa fractions, which contributed 62% and 32%, respectively,
ned additional active compounds which contribute to the vasoconstrictive resp
s, bark, stems, seeds, and pith, which contribute to their relatively high-fib
cated between nt fil80 and fi63, which contribute to basal expression [11].
    of E2F-dependent transcription, which contribute to its ability to suppress t
get gene p21WAF1 is also induced, which contributes to implementation of cell c
nd antagonized by agouti, both of which contribute to the variability seen in
Furthermore, mutation of Trp84, which contributes to the dimer interface in t
al regions should identify genes which contribute to the complex trait. Demon
    induces nuclear factor-B (NF-B), which contributes to the gene expression of
    d proteinase inhibitors, many of which contribute to sustaining inflammation a
dgments We thank the many people who contributed to the study, including man
, Gill McGauley, and David Fainman, who contributed to the data collection, t
otein. Genetic screens, therefore, will contribute further to understanding de
ocesses. It is likely that plants will contribute several new biological proce
ked. We believe that these traits will contribute significantly to the effica
ccess exhibited by T. giacomellii will contribute significantly to its efficac
and neutralising antibodies, that will contribute substantially to our underst
n of other detoxification enzymes, will contribute to variability of GSTp inh
, which in its fibrillogenic form will contribute to increased fibril formatio
    part of the dorsal mesoderm that will contribute to anterior head, posterior
```

Figure 40 Concordance lines of the node word contribute

Compare the HSC examples below:
9. Food transfers seem to be an important contribution to the total food obtained by young.
10. All these mechanisms contribute importantly to the shaping of animal embryos.
11. It is thus unlikely to make a substantial contribution to rejection of cytosine.
12. That will contribute substantially to our understanding of the overall biological significance.
13. Abnormalities in potassium channel function are also unlikely to substantially contribute to conduction disturbances.

With regard to the semantic classification of these adverbs, three of them refer to adverbs of manner which give account of how an action (contribute) is performed. As can be seen from the examples above this general sense may present specific connotations depending on the context they appear in. For instance, the adverb substantially in example (12) refers to the overall
importance of a given contribution, whereas in example (13) the same adverb is used in its more specific contextualised statistical / quantitative sense.

## c) noun + contribution

Not only do attributive adjectives premodify the abstract noun contribution. Premodification by means of another noun also occurs in the HSC corpus. However, it should be pointed out that nouns as premodifiers of contribution are not as common as adjectives. Among the most frequent $\mathrm{N}+\mathrm{N}$ sequences, the following chunks could be identified: call contributions, cell contributions, gene contributions, group contributions, mutation contributions.

All these sequences contain content words and express a source relationship between the modifying noun (on the left) and the head noun contribution (on the right). In other words, the modifying noun expresses the source of the head: contributions are provided by cells, genes, a group, etc., as is clearly observable in the examples below:

Source relationship $\mathbf{N + N}$ sequence $\quad$| Meaning / paraphrase |
| :--- |

\[

call contributions \rightarrow \quad\)|  contributions provided by the  |
| :--- |
|  calls  |

\]

HSC example:
"Because our subjects differentially contributed to the number of calls recorded in each
session, it is possible that our analyses were biased by calls from particularly vocal
contributors. However, the extremely high percentages of correctly classified syllables
suggests that unequal call contributions played little role in our discriminant function
classification results." cell contributions $\rightarrow$ contributions from cells
HSC example:
"Glucose phosphate isomerase (GPI) analysis (Papaioannou and Johnson, 1993) was performed on spleen samples from the two mice with ALL to estimate the contribution originating from the CCB-derived ES cells, injected into the C57BI/6 blastocysts. Both mice had significant CCB ES cell contribution in the spleen (data not shown) suggesting that the lymphoblastic tumours are of ES cell origin."
gene contributions $\rightarrow$ contributions from genes

## HSC example:

"Unlike these HOXA and HOXD genes, the HOXC gene contribution is not restricted so closely to the 58 end of the cluster."
group contributions $\rightarrow$ contributions of / from a group
HSC example:
"Prior probabilities options were utilized to weight unequal group contributions, and syllables were analyzed and classified separately."

Table 21 Noun + contribution collocation pattern

## d) contribution + preposition

This pattern has proven to be frequent in the HSC. It is particularly noticeable the fact that $83 \%$ of the occurrences of contribution are postmodified by a prepositional phrase that delimits the meaning of the abstract noun. Contribution is postmodified by the prepositions of (126 occurrences), to (64 occurrences) and from (17 occurrences).


Figure 41 Prepositions following the noun contribution

It is important to mention that they are not simply function words (dummy prepositions) but, on the contrary, they are subcategorised by the abstract noun contribution in order to convey different meanings. In this context, each of them is used to refer to the source / origin / contributor (of / from) or the goal / purpose (to) of a contribution.

What seems to be rather remarkable is the fact that the prepositions of and from are equally interchangeable; that is, both of them refer to the origin / source of the contribution. There is no difference in between them and, in fact, they collocate with the same noun phrases. Consider some illustrating examples:
14. (...) with a significant contribution from surrounding cells.
15. (...) they did enable the extent of the contribution of the donor cell(s) within different tissues.
16. (...) that enabled the relative contributions from maternal and embryonic gene expression.
17. (...) it provides an opportunity to test the contributions of specific genes to neurobiological processes.
18. JGW wrote the paper with core contributions from all authors.
19. Barrow especifically discussed the contributions of women to the field of ornithology.

Despite being semantically equivalent, there are two worth mentioning aspects. Firstly, frequency rates show a preference for the use of the preposition of ( $88 \%$, 126 out of 143 occurrences) over from ( $12 \%, 17$ out of 143 occurrences). Secondly, there seems to be a recurrent tendency to use of in correlation with the preposition to. In other words, the combination "contribution from X to Y " does appear (e.g. "In the present study, a contribution from unlabeled hepatic lipid stores to TG synthesis may be less likely, because the subjects had been fasted for 24 hours by the end of the infusion test, which should substantially reduce hepatic lipid stores") but less frequently than the sequence "contribution of X to $\mathrm{Y}^{\prime \prime}$. Here are some examples:
20. Contributions of blastocyst micromanipulation to the study of mammalian development (...)
21. Contribution of prostaglandin EP2 receptors to renal microvascular reactivity (...)
22. We wished to determine more systematically the intrinsic contributions of individual Bcd-binding sites to transcriptional activation by Bcd.
23. Our ability to assess the relative contributions of genic and chromosomal factors to the genetic barrier (...)

Regarding the noun phrases that play the role of Prepositional complement of these sequences, they correspond to both animate [+/- volitional] (e.g., authors, cells, parasitoids) and inanimate entities (e.g., genes, processes, enzymes, metabolism). They all refer to scientific processes, substances and mechanisms which are characteristic of this specific genre. The following Table shows
frequent collocates found in combination with the pattern "contribution + of / to / from" (with the number of occurrences in brackets ${ }^{82}$ ).

| contribution + of (126 Occ) |  | contribution + to (64 occ.) |  | contrib |
| :---: | :---: | :---: | :---: | :---: |
| genes (6) <br> site (5) <br> factors (5) <br> cells (4) <br> receptors (4) <br> proper names (3) <br> proteins (2) <br> effects (2) <br> thymus (2) <br> mutation (2) <br> diet (2) <br> fatty acids (2) <br> fat accumulation box <br> membrane <br> substances <br> gluconeogenesis <br> enzymes <br> component <br> plasma <br> males \& females | studies age lineages reactions routes binding activities transcription mechanisms metabolisms infertility species process interactions experience pathway model rearrangement errors agents source variables individuals | gene activation <br> (4) <br> phenotype (4) <br> cell/gene pool <br> (2) <br> project (2) <br> the host (2) <br> interface (2) <br> process (2) <br> stabilization (2) <br> binding affinity <br> total amount of <br> values <br> mosaic <br> work <br> assembly <br> theory <br> metabolism <br> problem <br> strength <br> regulation <br> proteins | differences <br> mutation <br> the total <br> catalysis <br> properties <br> anaphase <br> binding <br> positioning <br> synthesis <br> specificity <br> understanding <br> genetic <br> isolation <br> development <br> cancer <br> progression <br> blood <br> pressure <br> degenerations <br> mechanisms <br> parameters <br> events <br> assays <br> model <br> rejection of | cells (2) <br> stores <br> mechanisms <br> parasitoids <br> cell pool <br> authors <br> biscuits <br> helicases <br> nitrosyl <br> (heme)hemoglobin <br> diet <br> de novo lipogenesis neighbours |

Table 22 Noun Phrases as Prepositional complements of the sequence contribution of / to / from

[^52]
### 4.7 The patterns of the noun decision

Despite being the least frequently used noun in comparison with the other four abstract nouns analysed so far, its environment in the HSC shows some special characteristics that justify its essential presence in this list. It is especially relevant the fact that the idea of "form an opinion after considering some facts" is more commonly conveyed by means of a verb in combination with decision than by the lexical verb decide, which shows a remarkably low frequency (61 entries, comprising all its formal realisations). Such a preference for periphrastic structures with an abstract noun will be discussed in much more detail in the following pages.
a) verb + decision

A total of 39 occurrences give account of this periphrastic use, out of which 17 entries ( $43,6 \%$ ) show restricted collocates whereas 22 ( $56,4 \%$ ) consist of free collocates. On the one hand, restricted collocates deserve special attention as the verbs that collocate with the abstract noun decision have undergone certain degree of delexicalisation. Make, take and reach in combination with decision are characterised by a loss of semantic content. They fulfil a verbal function but carry no meaning apart from this to contribute to the periphrasis in which they occur. The semantic content of the whole multiword unit, on the contrary, is being provided by the abstract noun.

Of great importance is the close relationship between the delexicalisation of these verbs and their syntactic behaviour. Data reveal that these periphrastic structures tend to be expressed in passive constructions (see Figure 42). The case of "make a decision" is worth mentioning as such a preference for passive structures is most outstanding.


Figure 42 Syntactic structures related to restricted collocates of the type $\mathbf{V}+$ decision

The focus of attention in these structures is not the agent but the decision itself being made. Concerning the "decision maker", it should be remarked that it tends to refer to the research team conducting the experiments described in the articles. Thus, they are not often made syntactically explicit as they are obvious from the context. See some examples expressed in the passive form:

1. (...) being present well before a decision about gender is made.
2. (...) other issues mentioned in this guide should also be considered before any decision is made about which clinic to attend.
3. (...) they are often derived from populations dissimilar to the individuals for which a decision must be made.
4. Also the decision to differentiate per se may be taken independently of the decision as to which lineage pathway to adopt.
5. Management and research decisions are usually reached by consensus.

As for examples in the active voice (a total of 5), it must be stressed that they are either associated with passive constructions somehow (see examples 6 and 7 below) or, alternatively, the "decision maker" is felt to be necessary as it is rather specific (examples 8-10):
6. I did not notice anything extremely controversial, but it still disturbs me because in conservation biology research results may be used to make far-reaching decisions.
7. If it was not accessed in making the decision to import the bruchids, then it highlights an important deficiency in biocontrol practice.
8. All patients were treated with chemotherapy so why would only a quarter of them make the same decision again?
9. The choice of experimental system is inevitably a compromise, and the different Parasite Genome Initiatives have reached different decisions based on the characteristics of the individual organisms.
10. Although such brute force comparative approaches cannot replace creativity, insight, and good experimental technique, they can allow clear analysis of past progress and enable the new group to make well-informed decisions regarding the direction of future research.

On the other hand, free collocates consist of fully lexical verbs in combination with the abstract noun decision. With no exception, all these structures, realised by 14 different verbs, namely: govern, support, influence, contemplate, control, allow, force, reconsider, base on, formulate, communicate, guide, face, think about, are used in the active voice. The noun phrases performing the syntactic function of Subject have proven to be determinant in the description of these free collocates. Consider the following Figures:

## GROUP 1

mechanisms
analysis
tools
methods
scientific evidence $\}+$ (govern, support, influence, control, allow, force, base
strategies something on, formulate, communicate) + a decision
pathways
modules
genes / genotypes


SUBJECT + PREDICATOR + OBJECT (decision)
Figure 43 Syntactic and semantic environment of free verb collocates + decision found in the HSC (Group 1)

## GROUP 2

$\left.\begin{array}{l}\text { proper names } \\ \text { the research group } \\ \text { patients }\end{array}\right\}+$ (contemplate, reconsider, face, think about) + a decision

## SUBJECT + PREDICATOR + OBJECT (decision)

Figure 44 Syntactic and semantic environment of free verb collocates + decision found in the HSC (Group 2)

Verbs in Group 1 (Figure 43) subcategorise for causers, tools and means as Subjects, whereas verbs in Group 2 (Figure 44) require agents. Both groups of verbs select the abovementioned semantic roles and give them the syntactic position of Subject. This fact explains why these free collocates are not used in passive structures. Compare the following examples:
11. This does not prove that genes of that class will influence the decision
(HSC instance)
12. This does not prove that the decision will be influenced by genes of that class (ad hoc instance)

The passive structure in example (12) shifts the focus of attention from the genes (causer) to the decision itself. An active structure is felt to be more appropriate in order to focus on the noun phrases that give account of the very specific causers / tools / experiencers that instigate the action described by each verb. Once again, it can be concluded that syntax is driven by lexis.

## b) decision + noun

Unlike the rest of the abstract nouns dealt with so far, this noun in combination with other nouns forms part of an endocentric (i.e. syntactically and semantically-headed) compound. A close look at these recurrent strings of words both from a lexicological and morphological perspective must be taken.

Compounds understood as "stems consisting of more than one root" (Jackson \& Zé, 2000:79) constitute a productive word formation process in English.

Although the orthographic treatment of compounds is not systematic at all throughout written articles, the examples consisting of $\mathbf{N}_{1}$ (decision) + $\mathbf{N}_{2}$ found in the corpus are written as two separate words with or without a hyphen between the two bases. According to Jackson and Zé (2000:80), compounds may be distinguished from phrases on syntactic and semantic grounds since they do have their own specific syntactic properties with regard to word order, modification and inflection.

For the position of each base in a compound, it must be underlined that they show an unexpected (marked) order. Taking the example of decision making process, possibly paraphrased as "a process that makes / contributes to make decisions", it can be observed that the Object of the verb make, decision, precedes the deverbal base. On the contrary, Objects follow verbs in sentence structure (i.e. to make a decision).

In addition to word order, the close relationship between the two bases of a compound should not be overlooked either; there is no element interrupting the strong connection between the two nouns. Compare the following examples:
13. Although not providing precise decision rules, the principles of risk
assessment are really helpful. (HSC example)
14. Although not providing precise decision of the rules, the principles of risk
assessment are really helpful. (ad hoc example)

The inclusion of a preposition and a determiner between decision and rules makes the unity of the two bases disappear and, as a consequence, such an structure cannot be regarded as a compound any more. On the same note, bearing in mind that compounds must be interpreted as a whole, their bases cannot be modified separately. Take the following example: "As expected for molecules that act at a key decision point, the activities of cyclinD- and cyclinE-dependent kinases are tightly controlled and subject to multiple tiers of regulation". Notice that the compound decision point is premodified by the adjective "key", which affects the whole unit. However, premodifiers of base2 (point) would not be acceptable:
15. As expected for molecules that act at a *decision key point, the activities of cyclinD- and cyclinE-dependent kinases are tightly controlled and subject to multiple tiers of regulation.
16. As expected for molecules that act at a *key decision important point, the activities of cyclinD- and cyclinE-dependent kinases are tightly controlled and subject to multiple tiers of regulation.

Likewise, compounds can only be inflected in terms of their grammatical category; that is, their bases cannot show inflection separately. To give some examples, consider the following ${ }^{83}$ :

| decision makers | *decisions maker/s |
| :---: | :---: |
| decision making | *decisions making |
| decision model/s, point/s, tree/s, rule/s | * decisions model/s |

Table 23 Inflected forms of decision + noun compounds

In fact, the inflected forms for the plural (i.e., decision models, decision points, decision trees, decision rules) refer to the two bases, which means the tree diagram that describes such structures should give account of this point:


Figure 45 Tree diagram for the compound decision models

[^53]Semantically, the compounds found within this pattern have acquired more specialised meanings. Their meaning is not a simple juxtaposition of the meaning of their constituents. Below are some examples of the endocentric verbal compound decision making in the different contexts it appears:
17. There were problems in the initial decision making process.
18. They propose a plan for conservation, reintroduction, and eventual restoration of the black-footed ferret that they claim will integrate biological and technical knowledge with the organizational structure of the decision-making body, the social behavior of the participants, local interests and human needs, and the legal parameters of reintroduction.
19. Our findings would ultimately provide a baseline decision-making strategy regarding the use of fungal pathogens.
20. Several organisations are responsible for decision making in transfusion safety.
21. Previous transfusion information was not always used in decision making.

As can be seen in the examples above, decision making (see its tree diagram in Figure 46 below) can be used as a noun (examples 20 and 21) or as a noun modifying another noun (i.e., process, body, strategy) in examples (17-19).


Figure 46 Tree diagram for the compound decision making

Another worth mentioning compound in the corpus is decision maker, which consists of a complex head maker and a non-head constituent realised by the abstract noun decision:


Figure 47 Tree diagram for the compound decision makers
At a first glance, this noun (i.e. decision maker) should be described as an endocentric verbal compound; that is, semantically equivalent to "someone who makes a decision". However, a more careful look at its environment reveals that this compound embraces a more opaque meaning. "Someone" in this context refers to an actual patient who has to make a decision about whether they wish to undergo an experiment / a treatment, etc. Consider some illustrative examples:
22. Estimates of lifetime costs (discounted at 6\% per year) and life years (discounted at 2\% per year) of HIV infected women and their children according to whether the woman's infection was known about during pregnancy. For a decision maker willing to pay up to $£ 10000$ to gain one life year, the net benefit of diagnosis would be $£ 49090$ ((6.392×£10 000)£14 833)), and it would be cost effective to devote this sum to detect one additional infected woman in an antenatal testing programme.
23. However, a decision maker assuming the most pessimistic net benefit scenario, but willing to pay up to $£ 15000$ per life year gained would spend the
same sum to identify an additional maternal infection as a decision maker assuming base case net benefit and willing to pay up to $£ 10000$ per life year gained.

In the light of the above examples, it seems clear that this compound has drifted away from its original compositional meaning (in the sense that its interpretation cannot be worked from the sum of the literal meanings of its constituents) and has adopted a more opaque meaning. This gradual lack of compositionality makes the whole unit fall under the category of semantically-headless (i.e. exocentric) compounds.

## c) decision + preposition

Contrary to what was expected, the abstract noun decision is hardly ever postmodified by prepositional phrases regarding the content of the decision made. But for 6 occurrences of prepositions following decision, the other entries for this noun show no postmodification by means of a prepositional phrase.

Two prepositions (i.e. about and on) appear within this pattern in combination with decision/s. Both of them (the preposition on to a much lesser extent, though) select noun phrases intended to specify what sort of decision is being made by an agent; they introduce a relationship of "respect", similar to regarding, with regard to, etc. Although both prepositions share the same meaning, the corpus data reveal a preference for decision about over decision on. When comparing the noun against its cognate lexical verb, figures reverse: the collocation decide on is more frequent than decide about (see Table 24 below).

Similarly, the concordance lines for decide provided by WordSmith Tools show that the same prepositional phrases, introduced by the same prepositions and providing the same semantic contents, may form part of the complementation of the lexical verb decide.


Table 24 HSC examples of the pattern decision + preposition vs. decide + preposition

## d) decision + to-infinitive

With reference to the kind of decision being made, the most common pattern shows the abstract noun decision followed by a "to-infinitive" clause. As observed previously, the abstract noun decision is unlikely to be found postmodified by a prepositional phrase. On the contrary, postmodification by means of a "to-infinitive" clause is much more common.
24. There are ethical and pragmatic issues associated with a decision to modify a screening programme which are beyond the scope of this study.
25. This updated result is much less affected by the decision to stop treatment early.

These noun clauses present the complete content of the head noun decision, which refers to an action. This goes reasonably well with the fact that the typical head nouns selecting "to-infinitive" clauses tend to be nominalised equivalents of verbs controlling "to-complement" clauses. Consider the following examples:
26. It will also be feasible to test whether the patients' decision to live or die can be controlled by the balance of active MAPKs in the cell, as has been suggested in mammals.
27. It will also be feasible to test whether it can be controlled if parents decide to live or die.
28. The decision to have another child after late loss in pregnancy is a personal one.
29. Parents decide whether to have another child after late loss in pregnancy (or not).

Another remarkable syntactic aspect of this pattern is that the "to-infinitive" may be preceded by whether, thus, giving rise to a subordinate interrogative clause that includes an infinitive clause. Such an alternative interrogative clause is likely to occur following a noun as decision since this abstract noun usually entails a choice (see example 30). Sometimes the correlative "(...) or" is not syntactically present as can be easily understood from the context (e.g. "They might attempt to influence his decision whether to help his mother").
30. On the other hand, ripe oocytes are heavily outnumbered by lymphocytes, and a cell population that is a minority within the body could still exercise an effective veto [Haig 1992] on the decision whether to ovulate.

From a semantic point of view, the type of infinitives that form part of these "toinfinitive clauses" are similar both as complements of the abstract noun decision and as complements of its corresponding verb, decide. Of the 123 entries for decision, 19 are of this type ("decision to", 15; "decision whether to", 4). Similarly, of the 61 entries for decide, 31 follow the pattern "V + to-clause" ("decide to", 27; "decide whether to", 4). Compare some examples:

DECIDE + TO-infinitive
decide to

\[\)| $\sim \text { change }$ |
| :--- |
| $\sim \text { initiate }$ |
| $\sim \text { restrict }$ |
| $\sim \text { stop }$ |
| $\sim \text { promote }$ |
| $\sim \text { proceed }$ |
| $\sim \text { release }$ |
| $\sim \text { sequence }$ |
| $\sim \text { focus }$ |
| $\sim \text { explore }$ |
| $\sim \text { examine }$ |
| $\sim \text { use }$ |
| $\sim \text { investigate }$ |
| $\sim \text { analyse }$ |
| $\sim \text { characterise }$ |
| $\sim \text { terminate }$ |
| $\sim \text { administer }$ |
| $\sim \text { see }$ |
| $\sim \text { isolate }$ |
| $\sim \text { help }$ |

\]

Figure 48 Examples of to-infinitive clauses following decision and its corresponding verb decide

## e) adjective + decision

Regarding the premodifiers of the abstract noun decision, there are two main categories: adjectives and nouns. The latter (e.g. cell fate decisions, management decision, research decisions) are not very common. Instead, there is a wide range of adjectives, both in attributive and predicative positions ${ }^{84}$, modifying the noun decision, for which semantic groupings can be established.

[^54]It seems useful to distinguish two main semantic groups of adjectives: descriptors and classifiers. As for descriptors, the list is significantly low (see Table 25 below for examples) in comparison with classifying / relational adjectives. This type of finding points to the fact that, as already discussed, the defining traits of scientific discourse make it prone to refer to precise processes and mechanisms, rather than expressing the attitudes of the writer with respect to the discussed issues.

| DESCRIPTORS |  | CLASSIFIERS |  |
| :---: | :---: | :---: | :---: |
| SIZE, EXTENT, TIME | EVALUATIVE | RELATIONAL | TOPICAL |
| Describing / denoting observable data with regard to time, extent, frequency and age | Expressing the attitude of the writer towards a decision; making judgements | Delimiting the referent of the decision | Referring to the subject area and/or showing a relationship between the adjective and the noun |
| recent <br> early <br> poor <br> careful <br> precise <br> complex | (im)moral | independent maximum initial ${ }^{*(3)}$ different important ${ }^{*}{ }^{*(2)}$ key operational far-reaching | clinical $^{\text {² }}$ programming patterning spatial developmental behavioral food-sharing |

Table 25 Semantic groupings of the attributive adjectives that collocate with the abstract noun decision ${ }^{85}$

### 4.8 Discussion of overall results

The main goal of the whole chapter was to provide a detailed account of the colligational and collocational patterns of abstract nouns in the HSC, so as to contribute to the characterisation of such phraseological units in medical science writing. After having investigated the various patterns the five abstract nouns in question (i.e., conclusion, agreement, comparison, contribution and decision) collocate with, several conclusions can be drawn from these findings.

[^55]Four processes need to be highlighted from the overall results: a) various degrees of delexicalisation in restricted verb collocates, b) gradual grammaticalisation involving semantic bleaching in prepositional bundles, c) preference for the use of periphrastic structures (i.e. verb + abstract noun) in passive forms and d) a general tendency for adjective collocates to appear in attributive positions. Each of these processes deserves further discussion.

Firstly, the five abstract nouns explored appear in restricted combinations of the type $V_{+}$Noun; in particular, the patterning associated with the lexical verbs make, reach, draw and take. Of the several senses related to these polysemic verbs, it has been proved that their core original meanings are not the most frequently used. On the contrary, the most prominent use of the above verbs points to the general meaning of "doing"; that is, the lexical verb has become a grammatical form with very little semantic content on its own. Thus, it can be stated that these verbs have undergone a process of what scholars (Sinclair 1992; Partington 1993; Howarth 1996, Hunston \& Francis 2000, among others) refer to delexicalisation and/or semantic depletion and, as a consequence, their original meaning is no longer the most prominent.

Howarth (1996:94) further claims that such delexical senses are being identified as semantically depleted not only on the basis of the semantic nature of the verb itself but also on the kind of noun in combination with it and the correspondence of the collocation to a morphologically related verb of equivalent meaning. These last two tests for semantic depletion will now be further discussed.

Following Howarth's (1996) theory, the nature of the noun may contribute to a certain extent to the fact that the $\mathbf{V}+$ Noun pattern be regarded as a restricted collocation. In his point, abstract nouns, such as the ones examined in this study (i.e. conclusion, agreement, comparison, contribution and decision), are more likely to be combined with semantically empty verbs; in other words, abstract nouns can activate the semantic weakening of the verb they collocate with: "the less concrete the noun is, the less possible it is for the primary literal sense of the verb to be activated' (Howarth 1996:97). In make chemical
products the noun (i.e. [chemical] products) is concrete and the verb (i.e. make) keeps its literal meaning of "creating, producing", whereas in make a conclusion the noun (i.e. conclusion) is abstract and the sense of the verb has faded away and, consequently, does not refer to the notion of "producing" anymore.

It seems thus that one of the main tests so as to label a given verb sense as delexical is the possible transformation from a V + Noun construction (i.e. make a contribution) to a lexical verb (i.e. contribute). In make a contribution, the verb could be replaced by provide and/or produce and such a transformation would keep working perfectly. However, if the noun (i.e. contribution) were substituted in the periphrastic structure, the sense of the whole multiword unit would be significantly altered. As Howarth (1996) states, "if the delexical verb is regarded as contributing little or no independent meaning to the whole collocation (having the role of a grammatical prop for the noun), then one is justified in considering that no substitute for a noun can exist for the verb in that sense." (Howarth 1996:112-113).

Concerning the equivalence of the periphrastic structure to a cognate verb, it is worth noting that this is an outstanding feature of the abstract nouns selected for the present analysis: make a conclusion ~ conclude; reach an agreement ~ agree; make a comparison ~ compare; make a contribution ~ contribute; make a decision ~ decide. In this respect, Howarth asserts that "collocations involving these verbs demonstrate a strong tendency to collocate with nouns that have cognate lexical verbs" (Howarth 1996:98). But for the case of comparison and contribution, the other three nouns outnumber their corresponding cognate verbs as far as frequency is concerned. Figure 49 below displays their exact number of occurrences in the HSC.


Figure 49 Frequency of abstract nouns in comparison with their corresponding verbs

It has been proved that periphrastic structures consisting of restricted verb collocates + Noun are semantically equivalent to the abstract noun's cognate lexical verb. The main question is then raised as to what syntactic features distinguish the periphrastic uses (i.e. delexical verb + Noun) from the full lexical synthetic constructions. Taking into account that "syntax is driven by lexis" (Francis 1993:142), it has been observed that despite being semantically interchangeable, there is a preference for the use of the periphrastic structure (i.e. delexical verb + conclusion/ agreement / comparison / contribution / decision) in passive constructions ${ }^{86}$. On the other side of the coin, their equivalent cognate lexical verbs are more commonly used in the active voice.

Free collocates have also been analysed. On average, the abstract nouns under study collocate with a wide range of free combination lexical verbs. Unlike restricted collocates, this pattern tends to be used in active constructions and its absolute frequency is much lower. Interestingly, it seems that the wider range of free collocates an abstract noun combines with, the less frequently such verbs are used. Figures have revealed that, but for few exceptions (e.g. support a conclusion, 67 occurrences), the absolute frequency of free combination verbs

[^56]is hardly significant as in most cases it consists of no more than two or three instances with a given noun (e.g. criticize a conclusion [2 occurrences]; establish an agreement [1 occurrence]; express a comparison [1 occurrence]; examine a contribution [3 occurrences]; formulate a decision [2 occurrences]).

The examination of abstract noun patterns in the HSC has also revealed a gradual process of grammaticalisation and semantic bleaching ${ }^{87}$ in multiword units like "in agreement with" and "in / by / for comparison", where the lexical items agreement and comparison in combination with certain prepositions have been transformed into grammatical forms and serve to link parts of a discourse; that is, they are used as connective operators. These two examples will now be considered in turn.

As stated earlier, the abstract noun agreement has substituted its corresponding cognate verb agree in many fixed expressions. In fact, in correlation with "in ... with" it must be regarded as a highly frequent lexical bundle which shows a high degree of unity. The abstract noun agreement in such a context forms part of a complex string of words that functions both semantically and syntactically as a discourse marker.

A similar process of decategorialisation (i.e. the noun loses part of its original function as a noun) has been found in other word strings, such as for comparison, in comparison and by comparison. In these contexts, the literal meaning of the abstract noun comparison is not applicable and, through a process of semantic loss, it is seen to acquire a new grammatical role (Gabelentz 1891; Sweetser 1988; Aitchison \& Lewis 2003) as a conjunct.

A further feature that is striking regarding the collocational patterns of abstract nouns in the HSC is that there is a general tendency for adjective collocates to be used as internal pre-head modifiers to the following abstract noun; that is, there seems to be a preference for the use of adjectives in attributive position. This trait has proven to be true for the five adjectives under study, since the

[^57]number of occurrences of adjectives functioning as predicative complements in clause structure is remarkably low in all cases. Taking, for example, the case of the abstract noun agreement, corpus data reveal that there are just two instances of predicative adjectives modifying this noun.

In addition, the typology of adjectives found in combination with abstract nouns in the HSC deserves special attention. As pointed out before (section 4.3), the kind of adjectives used to denote properties of abstract nouns fall into two main semantic groups: descriptors and classifiers. The properties conveyed by the former may relate to opinions (evaluative adjectives) and size, quantity, extent or time descriptors, whereas the latter refer to relational or topical adjectives.

With the only exception of agreement and conclusion, the other three nouns (i.e. comparison, contribution and decision) show a strong preference for relational (e.g. firm conclusion, direct comparison, relative contribution, initial decision) and topical (e.g. biological conclusion, statistical comparison, caloric contribution, clinical decision) classifying adjectives. These findings corroborate Biber's et al. (1999) assertion of the high use of classifiers in academic prose. Due to the fact that scientific writing is more concerned with defining and describing demonstrable data from an objective point of view, both topical and relational adjectives showing the subject area or a relation with the noun described are likely to be more frequently used.

In contrast, the nouns agreement and conclusion usually collocate with quantity, extent, time and evaluative descriptors (e.g. controversial conclusion, general agreement) in the HSC. The case of conclusion is particularly worth noting. Contrary to what might be expected in academic prose, this noun is more commonly modified by evaluative descriptors (e.g. misleading conclusion, controversial conclusion). Such unexpectedness lies in the fact that evaluative adjectives describe the position of the writer towards the discussed conclusion. According to Biber et al. (1999), this function of making personal judgements is considered to be more appropriate of fiction and literary
writing. Thus, this seems to be a distinctive feature of the collocational patterning of the abstract noun conclusion in the HSC.

Having identified and analysed the most salient patterns of the five abstract nouns under study, the chief emphasis of the following chapter will be placed on providing a detailed account of the informants' command of the phraseological patterning of abstract nouns in medical English. So as to examine their proficiency in the use of the collocations associated with abstract nouns, the data obtained from the worksheet of exercises as well as the information from the Survey Content-Based Questions will be studied.

On the one hand, the former will enable to identify the collocations that appear to be particularly difficult for informants. The analysis of how the collocations produced by these non-native speakers deviate from native-like collocation will reveal which collocations are specifically liable to confusion and which elements in the phraseological units considered turn out to be problematic for informants. On the other hand, the latter will inform about the subjects' perception with regard to the problem areas they encounter when writing their medical articles in English as well as their writing up process.

Once these problem areas have been identified, particularly useful resources and tools will be presented (cf. chapter 6). As will be further discussed in the following chapter, I firmly believe that the idiosyncrasies of noun patterns in scientific English justify the need to provide non-native speakers with suitable tools to help them become proficient in the use of the correct collocations of words when writing a paper in English.

## CHAPTER 5: INFORMANTS' DATA ANALYSIS

In the previous chapter, a detailed account of the colligational and collocational patterning of abstract nouns in the HSC corpus was set out. This chapter will introduce the second part ${ }^{88}$ of the survey conducted among a community of twenty-four Spanish doctors. The first and more substantial part of this chapter (section 5.1) comprises a set of exercises, aimed to test the informants' familiarity with the usage of nouns described in the previous chapter. The analysis of informants' difficulties when dealing with the abstract nouns in question will show how valuable the corpus-based research conducted in this study is. This is followed by a summary of the overall results (cf. section 5.2) concerning the informants' command of the collocational and colligational patterning of abstract nouns in medical English, which will, on the one hand, stress the importance of collocations in EFL writing and, on the other, validate the relevance of the corpus data analysis undertaken in chapter 4.

The last section of this chapter (cf. section 5.3) presents a further part of the abovementioned survey (i.e. Survey Content-Based Questions), which offers a more self-evaluative view of the participants' language skills as well as their needs. This part was included to offer informants a chance to state their own views and opinions on their writing process in English and also the resources they would like to have at their disposal so as to facilitate their written production in English.

It is worth pointing out that neither the list of deviant structures identified in the informants' responses to the worksheet of exercises (cf. section 5.1) nor the problem areas highlighted by informants themselves (cf. section 5.3) can of course be considered exhaustive since informants' publications in English have not been explored, but the results obtained can still be seen as an indication of what type of language help is relevant to provide to Spanish medical doctors who aim to publish internationally.

[^58]
### 5.1 Results obtained from the worksheet of exercises

As stated in chapter 3, with the aim of identifying the sort of difficulties researchers usually encounter when using abstract nouns in their academic papers, four exercises were handed out to the community of twenty-four informants involved in this study. Appendix 5 summarises the description and the aims pursued in each of the activities included in the worksheet distributed among participants.

This section presents the major results of the analyses of the abovementioned exercises (5.1.1 to 5.1.4), which are in turn compared against the results extracted from the HSC corpus (sections 4.3 to 4.7 ). The typology of exercises designed for this research ranges from "filling in the gaps" and "matching" exercises to "sentence translation from informants' L1 (Spanish) into English". Therefore, the sort of information provided by each of them is also varied. While in Exercises 2 and 3 participants were exposed to instances of real language in context, the "matching" exercises (i.e. Exercises 1 and 4) asked them to produce collocations in isolation ${ }^{89}$. Consequently, the retrieval of data from the former provided, as will be seen, much more significant information than the latter.

### 5.1.1 Fill in the Gaps Exercise

## Exercise 2. Predict the words which are missing. Complete the sentences below with a suitable word.

1. The research unit, within four days, $\qquad$ the conclusion that the government was not giving enough.
2. Comparisons between mice have been $\qquad$ .

The main aim of Exercise 2 was to identify the major types of difficulties informants had regarding the lexico-grammatical patterning of the five abstract nouns considered in the present research. As described in section 3.5, participants were requested to predict the missing words in a list of fifteen

[^59]sentences, randomly extracted from the HSC corpus (see Appendix 4). Each example contained either one or two (i.e. sentences 4, 9, 10 and 12) blank spaces that informants had to complete with a suitable lexical item. No additional guidance about the word class expected was supplied.

Unlike Exercise 1 and Exercise 4, the data displayed in this exercise provided informants with contextualised real examples; that is, they were not asked to associate lexical items in isolation but within a given context. The fact that the examples selected were real instances typical of the medical register was also intended to offer informants a more recognisable linguistic context. In addition, as will be discussed in the pages to follow, it should be borne in mind that some sentences allowed for more than one possible answer.

The findings obtained from this exercise give account of the informants' collocational competence with respect to three main combinatorial patterns; namely: restricted verb collocates (i.e. sentences $1,2,5,6,7,8,9$ and 15), free verb collocates (i.e. sentences $3,11,13$ and 14) and lexical bundles (i.e. sentences 4, 10 and 12).

## a) Group 1: restricted verb collocates

Evidence indicates that informants seemed to be aware of the light verbs most commonly used in combination with the abstract nouns examined (e.g. reach/ draw/ lead to a conclusion, make a comparison, make a contribution, reach an agreement). However, the use of verbs such as give (e.g. give a conclusion), do (e.g. do a contribution, do a comparison), be (e.g. be a contribution) and achieve (e.g. achieve an agreement, achieve a conclusion) where a different or more appropriate light verb was required reveals that these verb-noun combinations pose certain problems for non-native speakers.

Furthermore, the fact that a wide repertoire of free collocates was used when a restricted verb collocate was expected (e.g. report/ give/ adopt/ publish a conclusion; give/ bring/ report/ generate/ mean a contribution) reinforces my assumption that restricted verb-noun collocations are liable to confusion. The sentences in this group will now be analysed in turn.

Sentence 1: The research unit, within four days, reached the conclusion that the government was not giving enough.
Data show (cf. Figure 50) that informants were able to identify the most common restricted verb collocates associated with the noun conclusion (i.e. reach, draw, make, lead to and arrive at). The light verbs draw and reach (produced by 6 informants each) stand out as the most commonly used. However, as data from the HSC revealed (cf. section 4.3), the combination draw + conclusion tends to be more frequently used in passive constructions whereas reach + conclusion is much more common in the active form. Informants did not show a stronger preference for the latter in sentence 1, though.


Figure 50 Collocations provided by informants in Sentence 1 (Exercise 2)

Despite the high percentage of the restricted verb collocates provided ( $66,7 \%$ ), there is still a remarkable 29,2\% of informants who produced deviant collocations with free collocates as the following: give/ report/ adopt/ get/ obtain/ announce a conclusion. But for publish a conclusion, none of the other free collocates selected was found in the HSC.

Sentence 2: Comparisons between mice have been made.
Figure 51 below shows that the word combinations make a comparison (8 informants) and do a comparison (7 informants) stand out as the most commonly produced collocations in sentence 2 . On the contrary, data from the HSC corpus show a stronger preference for the use of make in combination with the abstract noun comparison, while the collocation do + comparison hardly ever occurred in the native corpus ${ }^{91}$.

| n | $\%$ |  |
| :--- | :---: | :---: |
| MADE | 8 | 33,3 |
| DONE | 7 | 29,2 |
| SIGNIFICANT | 2 | 8,3 |
| WRONG | 1 | 4,2 |
| PERFORMED | 1 | 4,2 |
| CLEAR | 1 | 4,2 |
| CONTRADICTORY | 1 | 4,2 |
| FAR-REACHING | 1 | 4,2 |
| DRAWN | 1 | 4,2 |
| CORRECT | 1 | 4,2 |



Figure 51 Collocations provided by informants in Sentence 2 (Exercise 2)

Another interesting feature in this sentence lies in the fact that $25 \%$ of informants produced an adjective rather than a passive form of a light verb. With the only exception of the adjective significant, the other five adjectives provided were not found as collocates of the noun comparison in the HSC. In fact, there were very few HSC examples of predicative complements (i.e. comparison is unique/ valid; comparisons are difficult) modifying the noun comparison. 6 informants (25\%), on the contrary, associated evaluative predicative adjectives (e.g. correct, contradictory and wrong) as common collocates of the noun comparison. This type of deviation therefore indicates that the use of delexicalised verbs (i.e. make, do) in combination with abstract nouns is a problem area for non-native speakers.

[^60]Sentence 5: Further trials are needed before any conclusion can be drawn about the protocol's efficacy.
Unlike the rest of the sentences in this group of verb-noun collocates, where a verb was expected, in sentence 5 informants were asked to elicit the abstract noun (i.e. conclusion) subcategorised by the restricted verb draw, which was the most frequently verb collocate of the noun conclusion in the HSC corpus ${ }^{92}$.


Figure 52 Collocations provided by informants in Sentence 5 (Exercise 2)

As can be inferred from Figure 52, a total of 21 informants ( $87,5 \%$ ) identified the abstract noun conclusion as the best collocate for the restricted verb draw. What seems worth mentioning in this case is the fact that 19 informants chose the form conclusion instead of its inflected counterpart conclusions, which was only chosen by 2 informants. Both forms are equally acceptable in this context but it should be borne in mind that the analysis of the noun conclusion in the HSC showed a strong preference for the use of the inflected form (145 occurrences) as opposed to its base form (39 occurrences).

The other two ${ }^{93}$ examples provided correspond to two inappropriate uses of the abstract noun agreement (i.e. "before any agreement can be drawn"), on the one hand, and the non-existent noun *inform (i.e. "before any *inform can be drawn"), on the other.

[^61]Sentence 6: Clinical examination and biochemical screening make an important contribution to the detection of abnormalities.

The analysis of the abstract noun contribution in the HSC (cf. section 4.6) revealed that the most common restricted collocate of that noun was make (25 occurrences) and, to a much lesser extent, provide (4 occurrences) and produce (1 occurrence). With respect to informants in this study, 29,2\% (7 informants) of those inquired associated make with the noun contribution whereas a higher percentage ( $37,5 \%$; 9 informants) chose the verb be (in its various inflected forms), as Figure 53 shows. This collocation should be more carefully looked at. Although the string be a contribution did appear in the native corpus, its frequency of occurrence was particularly low. The only three examples found across the 167 hits of the node word contribution in the HSC are the following:
(1) This chapter is a most outstanding contribution to our understanding of deer evolution and behavioural ecology.
(2) Food transfers seem to be an important contribution to the total food obtained by young beyond weaning age.
(3) [...] this computationally inefficient procedure is a unique contribution of Willis and Wiese.

One possible reason for the informants' high use of be in this context could be that this verb may be used with a wide range of nouns and may have different translation equivalents in Spanish. Nesselhauf (2005) in her study of collocations in learner corpora pointed to the same reasons with regard to collocations and free combinations with the lexical verb have.

| n | \% |  |
| :--- | :---: | :---: |
| IS(2)ARE(6)HAVE BEEN(1) | 9 | 37,5 |
| MADE/MAKE | 7 | 29,2 |
| GET | 1 | 4,2 |
| CONSTITUTES | 1 | 4,2 |
| MAY HAVE/PROVIDE | 1 | 4,2 |
| SUPPORT | 1 | 4,2 |
| HACEN ${ }^{94}$ | 1 | 4,2 |
| PLAY | 1 | 4,2 |
| BECOME | 1 | 4,2 |
| GIVE | 1 | 4,2 |



Figure 53 Collocations provided by informants in Sentence 6 (Exercise 2)

Deviations concerning the use of inappropriate free combinations are also present in examples such as support/ play/ become/ give/ get a contribution. Some other examples like "?constitute a contribution" seem to be influenced by the informants' L1 since the word string "make an important contribution to" could be translated into Spanish as "constituye/ supone una contribución importante a".

Sentence 7: They reached the final agreement that clinical examinations for defects in hips, vision and hearing, and other congenital abnormalities is less well founded on scientific evidence.

In line with the findings described in section 4.4, 13 informants (54,2\%) associated the restricted verb reach with the abstract noun agreement. However, the individual verbs listed in Figure 54 reveal that six other verbs (i.e.

[^62]achieve, conclude, support, be, have got and *porpouse ${ }^{95}$ ) were produced inappropriately by at least one participant in the study. A total of 8 informants $(33,3 \%)$ provided inappropriate verb collocates in sentence 7 , which contributes to reinforce the idea that the collocations of the type verb-abstract noun are remarkably difficult for the informants.


Figure 54 Collocations provided by informants in Sentence 7 (Exercise 2)

Sentence 8: Bruce Weir has made many important contributions to population genetic inference theory.
As already noted in sentence 6, the restricted verb make proved to be the most common verb in combination with the noun contribution in the HSC corpus. Whereas in sentence 6 the verb make was only produced by $29,2 \%$ of those inquired, in sentence 8 the use of make is significantly higher ( $58,3 \%$ ). See Figure 55 below:

|  | n | $\%$ |
| :--- | :---: | :---: |
| MADE | 14 | 58,3 |
| DONE | 4 | 16,7 |
| PROVIDED | 1 | 4,2 |
| CONTRIBUTED | 1 | 4,2 |
| GIVEN | 1 | 4,2 |
| BROUGHT | 1 | 4,2 |
| REPORTED | 1 | 4,2 |
| NO REPLY | 1 | 4,2 |



Figure 55 Collocations provided by informants in Sentence 8 (Exercise 2)

[^63]Concerning the other verb collocates listed in the Figure above, the most outstanding deviation corresponds to the word string do a contribution, produced by $16,7 \%$ of the informants. This inappropriate choice of the verb do reflects the widespread confusion (Kaszubski 2000; Nesselhauf 2005) of certain pairs of high frequency verbs (i.e. do for make) used as light verbs in verb-noun collocations. Although this confusion is relatively low (i.e. 4 occurrences of do as opposed to 14 of make), the choice of light verbs in combination with abstract nouns appears to be problematic for the medical community under study. Further indications of this assertion can also be found in the fact that another $16,7 \%$ of the informants resorted to the use of free collocates such as ?give a contribution, ?contribute a contribution, ?bring a contribution and ?report a contribution, which were not found in the native production.

Sentence 9: These results led to some important conclusions.
As indicated in Figure 56 below, the collocations most frequently produced in this sentence were the following: lead to a conclusion, draw a conclusion and reach a conclusion. These three word combinations were in turn the most frequent ones in the HSC. However, draw a conclusion should not be regarded as an acceptable answer in sentence 9 since informants were required to provide two word forms rather than one.


Figure 56 Collocations provided by informants in Sentence 9 (Exercise 2)

The above requirement made the other 10 informants who completed the sentence use a variety of strategies: two informants provided a modal verb in combination with a free verb collocate (e.g. can support, can provide), six informants made use of the auxiliary "have perfective" collocating with either the restricted verb collocate reach (e.g. have reached) or some unacceptable free verb collocates (e.g. have achieved, have supposed, have brought), one informant used the emphatic do with the free collocate allow, which was not found in the HSC either, and, finally, another informant chose an inappropriate phrasal verb (e.g. "?these results made up some important conclusions").

Sentence 15: These multivitamins do not appear to provide significant contributions to the parameters tested.
The results found in sentence 15 (cf. Figure 57) are very similar to what was discussed for sentence 8 above. In this case $45,8 \%$ of the informants wrote make as an appropriate restricted verb collocate of the noun contribution. In the HSC example, the chosen verb was provide, which, as noted in section 4.6, was less frequently used. In line with this trend, there was no instance of provide in the repertoire of verbs produced by informants.


Figure 57 Collocations provided by informants in Sentence 15 (Exercise 2)

With regard to the other verbs used in this sentence, a further type of inappropriate collocations is worth discussing. It consists of free collocates that
were not found in combination with the noun contribution in the HSC. Examples of this category are: add / generate / *modify ${ }^{96}$ / get / mean / give / ?contribute contributions. The second type of questionable collocations, produced by three informants (12,5\%), corresponds to the word string have a contribution. As mentioned earlier, the light verb have tends to be used in combination with a wide range of verbs in English (e.g. have access to, have an influence, have a need, have significance, have relevance). However, the collocation have a contribution was not found in the native corpus.

## b) Group 2: free verb collocates

The second combinatorial pattern to be examined in this exercise is the informants' competence in using free verb collocates with abstract nouns. So as to explore whether this was a particularly difficult area for non-native speakers, four examples were selected (i.e. sentences 3, 11, 13 and 14) from the HSC, which will be now analysed in detail.

Sentence 3: Such a conclusion is supported by our observations.
$37,5 \%$ of the informants referred in their production to either support a conclusion or confirm a conclusion, which had also revealed as the most usual free combinations in the HSC (cf. section 4.3). Five informants produced an inappropriate word class, an adjective, giving rise to unexpected instances (e.g. "such a conclusion is contradictory ${ }_{\text {[3 informants] } / \text { valid }}^{\text {[1 informant] }} / \underline{\text { wrong }^{97}}$ [1 informant] by our observations"). The reasons for that inappropriacy lie in the fact that the "by-Prepositional Phrase" requires a passive participle rather than an adjective in the example provided.

Among the other free verb collocates provided by informants, it should be stressed that they did not appear as collocates in the native corpus. Thus, examples such as take a conclusion, prove a conclusion, share a conclusion, give a conclusion and obtain a conclusion were not found in the HSC. The word string *enforce a conclusion, though inappropriate in its morphological form, should not be grouped along with the already cited deviant collocations since it

[^64]seems it refers to reinforce a conclusion, which was used three times in the native data.

|  | n | $\%$ |
| :--- | :---: | :---: |
| SUPPORTED | 6 | 25,0 |
| CONFIRMED | 3 | 12,5 |
| CONTRADICTORY | 3 | 12,5 |
| TAKEN | 2 | 8,3 |
| MADE | 2 | 8,3 |
| ENFORCED | 1 | 4,2 |
| DRAWN | 1 | 4,2 |
| PROVEN | 1 | 4,2 |
| VALID | 1 | 4,2 |
| WRONG | 1 | 4,2 |
| SHARED | 1 | 4,2 |
| GIVEN | 1 | 4,2 |
| OBTAINED | 1 | 4,2 |



Figure 58 Collocations provided by informants in Sentence 3 (Exercise 2)
Another remarkable feature is the use of restricted verb collocates in this context. Data from Figure 58 above reveal that two informants wrote made and drawn in their answers to this sentence. These two inappropriate uses of support verbs indicate that informants find it difficult to discriminate between restricted and free collocates in combination with the abstract noun conclusion.

Sentence 11: Despite these conservative features, our analysis broadly supports the recent decision by the Department of Health that HIV testing should be offered universally.

|  | n | $\%$ |
| :--- | :---: | :---: |
| SUPPORT/S | 15 | 62,5 |
| LED/LEAD TO | 2 | 8,3 |
| NO REPLY | 2 | 8,3 |
| AGREEMENT | 1 | 4,2 |
| ACCEPTED | 1 | 4,2 |
| CONCLUDE | 1 | 4,2 |
| CONFIRM | 1 | 4,2 |
| CORROBORATE | 1 | 4,2 |



Figure 59 Collocations provided by informants in Sentence 11 (Exercise 2)

As shown in Figure 59, most informants (15; 62,5\%) produced the verb support as the most common free verb collocate of the noun decision. With the only exception of two informants who provided an inappropriate restricted verb collocate (e.g. "our analysis broadly ?led to the recent decision by the Department of Health that HIV testing should") and another informant who appeared to have confused the verb agree with the abstract noun agreement and thus produced an ungrammatical sentence (i.e. "our analysis broadly *agreement the recent decision by the Department of Health that HIV testing should be offered universally"), the rest of the informants' contributions correspond to free verb collocations:
(4) Our analysis broadly accepted the recent decision by the Department of Health that HIV testing should be offered universally.
(5) Our analysis broadly conclude(s) the recent decision by the Department of Health that HIV testing should be offered universally.
(6) Our analysis broadly confirm(s) the recent decision by the Department of Health that HIV testing should be offered universally.
(7) Our analysis broadly corroborate(s) the recent decision by the Department of Health that HIV testing should be offered universally.

None of the above collocations was observed in the examination of the HSC. In this respect, Nesselhauf (2005:210) claims that a possible reason for this type of inappropriate free combinations lies in the fact that in these cases both the verb and the noun are chosen independently of each other, which may bring about an inappropriate selection of individual elements.

Sentence 13: It was not possible to determine the relative contribution of this glucose derived directly from fructose.
$37,5 \%$ of those inquired wrote either assess (20,8\%; 5 informants) or determine ${ }^{98}$ ( $16,7 \%$; 4 informants) in their responses to sentence 13 , which seems to go in line with the findings observed in section 4.6: the most frequent free collocates of the noun contribution in the native corpus were determine (5 occurrences) and assess (3 occurrences).

[^65]|  | n | $\%$ |
| :--- | :---: | :---: |
| ASSESS | 5 | 20,8 |
| DETERMINE/ |  |  |
| *DETERMINATE | 4 | 16,7 |
| KNOW | 2 | 8,3 |
| MEASURE | 2 | 8,3 |
| SHOW | 2 | 8,3 |
| PROVE | 2 | 8,3 |
| DRAW | 1 | 4,2 |
| NO REPLY | 1 | 4,2 |
| ASSUME | 1 | 4,2 |
| CONCLUDE | 1 | 4,2 |
| REACH | 1 | 4,2 |
| PREDICT | 1 | 4,2 |
| CONFIRM | 1 | 4,2 |



Figure 60 Collocations provided by informants in Sentence 13 (Exercise 2)
As noted before, however, there is a general tendency across the non-native production to use a wide range of free collocates in combination with the noun contribution. This was also observed in the native corpus but, interestingly, none of the free collocates provided by the informants in this sentence (cf. Figure 60 above) coincides with the ones found in the native corpus (cf. Table 19 in section 4.6). This mismatch stresses, as will be discussed later on, the convenience of providing non-native speakers with the collocational patterns that typically occur in medical discourse.

Sentence 14: They will certainly support the decision the group has made.
As evidenced by the informants' responses to the previous example (i.e. sentence 13), some participants appeared to be aware of the most frequent free verb collocates that occur with the abstract noun decision. A remarkable 41,7\% wrote either support (5 informants) or accept (5 informants) in the space provided in sentence 14. Both support a conclusion and accept a conclusion were also frequently used combinations in the HSC. However, data in Figure 61 reveal that more than half of the informants $(54,1 \%)$ either offered free verbnoun collocations that did not occur in the HSC data ( $41,6 \%$; 10 informants) or produced restricted verb-noun collocations with the verb make ( $12,5 \%$; 3
informants), which resulted in ungrammatical instances (e.g. "they will certainly *make the decision the group has made").


Figure 61 Collocations provided by informants in Sentence 14 (Exercise 2)

## c) Group 3: lexical bundles

The third aspect to be explored in this exercise concerned participants' competence regarding the use of three main lexical bundles; namely, in agreement with, there is (adjective) agreement that and in comparison with/to which were very productive ${ }^{99}$ in the native HSC corpus.

Sentence 4: The data presented here are not in agreement with the model of Studier and Bandyopadhyay.
A total of 9 deviant collocations were found in sentence 4. Evidence from the participants' responses reveals that only 11 informants (45,8\%) produced the lexical bundle in agreement with correctly. The following Figure displays all the collocations provided:

[^66]|  | $n$ | $\%$ |
| :--- | :---: | :---: |
| IN...WITH | 11 | 45,8 |
| NO REPLY | 4 | 16,7 |
| TOTALLY...WITH | 2 | 8,3 |
| FULLY...WITH | 2 | 8,3 |
| REPORTED...WITH | 1 | 4,2 |
| INCLUDED IN |  |  |
| THE...OF | 1 | 4,2 |
| VALID...IN | 1 | 4,2 |
| VALID...FOR | 1 | 4,2 |
| ENOUGH...WITH | 1 | 4,2 |



Figure 62 Collocations provided by informants in Sentence 4 (Exercise 2)

Among the inappropriate collocations, two different types stand out. The most salient one is the use of an adjective (i.e. enough), a passive participle (i.e. reported) or an adverb (i.e. totally, fully) for the preposition in. See the following examples:
(8) *The data presented here are not enough [1 informant] agreement with the model of Studier and Bandyopadhyay.
(9) *The data presented here are not reported [1 informant] agreement with the model of Studier and Bandyopadhyay.
(10) *The data presented here are not totally [2 informants] agreement with the model of Studier and Bandyopadhyay.
(11) *The data presented here are not fully [2 informants] agreement with the model of Studier and Bandyopadhyay.

The choice of adverbs in examples (10) and (11) above deserves special attention. Despite the fact that both of them result in deviant combinations, these two adverbs are very common collocates of the verb agree and, similarly, the adjectives full and total proved to be frequent premodifiers of the abstract noun agreement in the HSC (cf. section 4.4). This seems to indicate that informants were familiar with some collocates of the abstract noun agreement as well as with its cognate lexical verb agree, but did not control the lexical bundle in agreement with, which, as discussed in section 4.4, shows a high degree of semantic unity and works as a whole grammatical unit.

The other type of deviant collocations in this sentence corresponds to those combinations produced by three informants where the two elements associated with the noun agreement were unacceptable:
(12) *The data presented here are not included in the agreement of ${ }_{[1 \text { informant }}$ the model of Studier and Bandyopadhyay.
(13) *The data presented here are not valid agreement in ${ }_{[2}$ informants] the model of Studier and Bandyopadhyay.
(14) *The data presented here are not valid agreement for [2 informants] the model of Studier and Bandyopadhyay.

The three examples above suggest that these informants were not familiar with the structure of the lexical bundle required in this sentence.

Sentence 12: There is general agreement that the primitive host cell was anaerobic. The HSC revealed that $47 \%$ of the occurrences of the four-word bundle "there is (adjective) agreement that' were used to introduce clauses (cf. section 4.4). Thus, I was especially interested in examining how competent informants were in producing this lexicalised expression.

|  | n | $\%$ |
| :--- | :---: | :---: |
| THERE...THAT | 12 | 50,0 |
| NO REPLY | 5 | 20,8 |
| IT...THAT | 2 | 8,3 |
| THERE...IN | 1 | 4,2 |
| THERE...ABOUT | 1 | 4,2 |
| FINALLY...THAT | 1 | 4,2 |
| THE RESULT...WITH | 1 | 4,2 |
| THIS...WITH | 1 | 4,2 |



Figure 63 Collocations provided by informants in Sentence 12 (Exercise 2)

Percentages in Figure 63 evidence that half of the participants in the study produced the lexical bundle there is (general) agreement that accurately, while the other half had problems with at least one of its constituents. The existential there introducing this word string was not provided by 5 informants, among whom 4 either used different types of subjects, such as the impersonal pronoun it (2 informants), a noun phrase (e.g. the result; 1 informant) or the demonstrative pronoun this, whereas the fifth informant provided no subject (e.g. "*finally is general agreement that"). In both cases, informants' examples resulted in unacceptable word combinations.

On the other hand, there were two informants who had problems with the function word introducing the "that-clause" immediately following the abstract noun agreement. These two informants, as the examples below show, produced an inappropriate preposition (i.e. in, about) instead:
(15) There is general agreement *in [1 informant] the primitive host cell was anaerobic.
(16) There is general agreement *about [1 informant] the primitive host cell was anaerobic.

Another remarkable feature in this sentence is the high percentage (20,8\%) of informants who supplied no answer. This fact reinforces the idea that this type of collocation was particularly problematic for the Spanish medical community examined in this investigation.

Sentence 10: To assess the cost effectiveness of universal antenatal HIV screening in comparison with selective screening in the UK.
This example has proven to be especially difficult for the participants in the study, as the data displayed in Figure 64 below indicate:

|  | n | $\%$ |
| :--- | :---: | :---: |
| IN...WITH | 8 | 33,3 |
| NO REPLY | 7 | 29,2 |
| IN...TO | 4 | 16,7 |
| WE'LL MAKE A...WITH | 1 | 4,2 |
| REQUIRE..WITH | 1 | 4,2 |
| AS...TO | 1 | 4,2 |
| WE MADE A...BETWEEN | 1 | 4,2 |
| STATISTICAL...LEADED TO | 1 | 4,2 |



Figure 64 Collocations provided by informants in Sentence 10 (Exercise 2)

Altogether, 12 informants (50\%) wrote the appropriate collocations in comparison with (8 informants) or in comparison to (4 informants). These figures are also comparable to the results obtained in the HSC. As was discussed in section 4.5, the occurrences of in comparison with outnumbered the instances of in comparison to by 46 to 30.

Nevertheless, 5 participants (20,8\%) produced other word combinations consisting of inappropriate uses of clauses (cf. examples (17) and (18)), verb phrases (cf. example 19), prepositions (cf. example (20)) and adjectives (cf. example (21)):
(17) ?To assess the cost effectiveness of universal antenatal HIV screening we'll make a comparison with [1 informant] selective screening in the UK.
(18 ?To assess the cost effectiveness of universal antenatal HIV screening we made a comparison between ${ }_{[1}$ informant] selective screening in the UK.
(19) To assess the cost effectiveness of universal antenatal HIV screening *require comparison with ${ }_{[1 \text { informant }}$ selective screening in the UK.
(20) To assess the cost effectiveness of universal antenatal HIV screening *as comparison to ${ }_{[1}$ informant] selective screening in the UK.
(21) To assess the cost effectiveness of universal antenatal HIV screening statistical comparison *leaded to [1 informant] screening in the UK.

Examples (17) and (18) were quite elaborated and included restricted verb collocates which typically occur with the noun comparison (i.e. make a comparison). However, one of the objects of comparison was missing in both of them (i.e. "we'll make a comparison [of]... with...", "we made a comparison between selective screening in the UK [and]..." In Nesselhauf's view,

> "a verb-noun collocation is not only understood as comprising a verb and a noun but also the central determiners, noun complementation structures, and so forth that are present. All elements in an expression such as come to the conclusion that would therefore be considered to belong to the collocation, and deviations in any of these elements are considered to be deviations in the collocation." (Nesselhauf 2005:71)

Accordingly, word combinations such as the above (i.e. examples (17) and (18)) must also be regarded as unacceptable. Likewise, examples (19), (20) and (21) are inappropriate in spite of the fact that they include some lexical items such as the adjective statistical and the preposition as which, as noted in section 4.5, are usually associated with the noun comparison in other word combinations (i.e. statistical comparison, as a comparison).

One last outstanding feature in this sentence is the high percentage of informants (29,2\%; 7 informants) who did not provide any answer. As
mentioned in the analysis of sentence 12, these figures seem to prove unmistakably the informants' lack of knowledge about the appropriate use of the lexical bundles explored in this exercise.

All in all, the analysis of informants' production in Exercise 2 has yielded very interesting findings regarding their command of restricted verb-noun collocates and free combinations of the type $\mathbf{V}+\mathbf{a b s t r a c t}$ noun on the one hand, and their knowledge of the use of some lexical bundles (e.g. in agreement with, in comparison with/to, there is (adjective) agreement that), on the other.

Although most informants seemed to be familiar with frequent restricted verbnoun collocates (e.g. reach / draw a conclusion, make a comparison, make a contribution, reach an agreement), a high percentage of free combinations was used where a restricted collocation would apply more often in the native production. Within the group of restricted verb-noun collocations, a great number of verb deviations were also observed in the use of high-frequency support verbs in collocations, such as reach vs. achieve an agreement, make vs. do a contribution, be vs. have a contribution. This finding highlights the fact that these pairs of light verbs hinder the participants' written production in English.

Concerning the overall use of free combinations, it should be noted that while informants were able to produce the most common free collocates found in the HSC, they also proved to have difficulties in discriminating between appropriate and unacceptable word combinations since some of their productions were deviant collocations not traced in the native corpus (e.g. *take a conclusion, *adopt a decision). Exercise 2 has also highlighted participants' lack of awareness of the correct use and structure of some prefabricated expressions (i.e. lexical bundles), which typically occur in medical writing.

In the analysis of Exercise 3 that follows, the mechanisms used by informants when asked to translate some sentences into English will be explored. The
examination of their translations will inform about participants' knowledge of the multiword units under discussion.

### 5.1.2 Translation Exercise

Exercise 3. Provide a suitable translation into English for the following sentences.

1. Se produjo un acuerdo casi unánime entre ambos métodos.
2. No se realizaron comparaciones para determinar diferencias de género ni de edad.
$\qquad$

Exercise 3 aimed at analysing informants' written production with regard to the collocational patterning of the selected abstract nouns. Participants were required to provide suitable translations into English for a total of eight sentences, each of which was related to some of the patterns discussed in chapter 4 (i.e. there + be + (adjective) agreement, in conclusion, contribute to vs. contribution, restricted verb collocate + (adjective) + comparison, free verb collocate + (adjective) + conclusion and decision making).

Unlike the other three exercises in the worksheet, Exercise 3 supplied not only information about participants' command of the combinatorial patterning of abstract nouns in medical English, but also their knowledge of other related morphological and syntactic aspects such as word order, the use of passive constructions and the different word forms of lexical units.

Bearing in mind that the main focus of this thesis is on the informants' production with reference to the behaviour of abstract nouns, this linguistic analysis will not cover other deviations observed in the collected data, such as the misuse of the definite article (e.g. the researchers vs. researchers), misspelling of certain lexical items ${ }^{101}$ (e.g. organisations ~ *organitations,

[^67]scientists ~ *scientificts), confusion with modal verbs (e.g. must vs. have to), problems with verb tenses (e.g. present perfect vs. past simple) as well as some difficulties with dummy prepositions (e.g. responsible *in for responsible for). The individual translations for each sentence are shown in Appendix 6.

Sentences were divided into five groups according to the kind of pattern they were examples of; namely, a) lexical bundles (sentences 1 and 3), b) the pattern restricted verb + comparison (sentences 2 and 6), c) the use of the verb contribute as opposed to its cognate noun contribution (sentence 4), d) restricted and free verb collocates associated with the noun conclusion (sentences 5 and 7) and e) the compound decision making. The results obtained in each group will be discussed in the pages to follow.

## a) Informants' command of the lexical bundles there + be + (adjective) agreement and in conclusion

So as to ascertain whether the production of the lexical bundles there $+b e+$ (adjective) agreement and in conclusion was particularly difficult for informants, they were asked to translate into English the Spanish expressions "se produjo un acuerdo casi unánime" (sentence 1) and "en resumen" (sentence 3). Here, the translation equivalents provided by participants will be shown so as to illustrate some relevant discussion points. As already stated, the translations of the full sentences produced by each informant are included in Appendix 6.

Sentence 1: Se produjo un acuerdo casi unánime entre ambos métodos.
HSC example: There was almost perfect agreement between the two methods.

The analysis of informants' instances exemplifies well that the lexical bundle there $+b e+$ (adjective) agreement, as already noted in Exercise 2, was not easily identified. Only 5 informants produced the string there was agreement as the equivalent for the Spanish construction "se produjo un acuerdo":
(22) There was almost total agreement [...]
(23) There was an almost complete agreement [...]
(24) There was a broad agreement [...]
(25) There was an almost general agreement [...]
(26) There was almost a unanimous agreement [...]

A closer look at the examples above reveals that four informants included an indefinite article (i.e. a/an) between the copular verb and the notional subject that contained the abstract noun agreement. The HSC instance, on the contrary, does not contain any article. On the one hand, the fact that in the native corpus there is no determiner preceding the noun agreement should not be overlooked, since it underlines the idea that there is a strong connection among the elements involved in this multiword unit, which must be understood as a fixed expression. On the other hand, examples (23-26) appear to indicate that non-native speakers were not fully aware of the fixedness of the structure and, thus, might have used an indefinite article so as to translate literally "un acuerdo" into an agreement.

The other 16 informants ${ }^{102}$, who did not use the existential there as an equivalent subject for the Spanish impersonal construction, produced deviant collocations. It seems clear from the data that although participants appeared to be aware of the fact that the subject in the English version had to be realized syntactically by means of a phrase, most of them failed to find an appropriate equivalent of the Spanish construction with the reflexive pronoun "se".

The most common deviation found in the data corresponds to the use of a passive construction instead of the expected impersonal structure with the existential there: a total of 11 informants converted the Spanish impersonal "se" into a passive sentence in English, in which the gap of the subject was filled by either the abstract noun agreement ( 8 instances; cf. examples $27-33$ ) or by the impersonal pronoun it (3 instances, cf. examples 34-36):
(27) A nearly unanimous agreement [...] was reached [2 informants].
(28) An almost unanimous agreement was achieved.
(29) A near unanimous agreement was obtained.
(30) An almost general agreement [...] was taken.

[^68](31) An almost general agreement [...] was reached.
(32) An agreement was done [...]
(33) An almost unanimous agreement was reached.
(34) It was reached an agreement.
(35) It was produced an agreement.
(36) It was ??? a ??? ${ }^{103}$ agreement between both methods.


#### Abstract

All the above examples reflect repeated efforts on behalf of the informants to cope with the problem of translating the reflexive pronoun "se" into English. While in instances (27-33) the notional subject agreement, along with its various premodifiers (e.g. unanimous, general) and postmodifiers (e.g. between both methods), occupies the initial position and, thus, constitutes a deviant example in which the end-weight principle is not met, examples (34-36) are clear instances of literal translations of "se produjo" into "it + be + passive participle", ranging from "it was reached an agreement", where an appropriate restricted verb collocate is used, to "it was produced an agreement", where the literal translation is most evident.


The extended use of the passive across participants' translations in this sentence has given rise to their production of several restricted and free verb collocates in the form of passive participles. With the only exception of reach (i.e. an agreement was reached), which was used by 5 informants, the other verbs produced (i.e. take, produce, achieve, obtain and do) constitute inappropriate verb collocates of the abstract noun agreement. None of them was found in the HSC verb + agreement occurrences analysed in section 4.4. This is a further indication of informants' lacking awareness of the collocational patterning of this abstract noun.

High degrees of L1 influence can also be observed in the selection of the adjective unanimous as a premodifier of the noun agreement. As can be seen in examples (37-41) below, 8 informants chose "unanimous agreement" as the translation equivalent of the Spanish "acuerdo unánime". Although the descriptor unanimous can be found as a common collocate of other nouns such

[^69]as decision, verdict and support, it hardly co-occurs with the noun agreement. In fact, it was only traced in the BoE (63 occurrrences), since no instance of the string "unanimous agreement" could be found either in the HSC or in the BNC. Informants' consistent production of this word combination seems to be thus influenced by their L1:
(37) *a nearly unanimous agreement
(38) *an almost unanimous agreement [3 informants]
(39) *a near unanimous agreement
(40) *an unanimous agreement [2 informants]
(41) *a unanimous agreement

For the 14 cases where an attributive adjective was provided, only 6 instances contained premodifiers which were also found in the HSC: general agreement (3 informants), total agreement (1 informant), broad agreement ( 1 informant) and complete agreement (1 informant). Besides, data reveal that very few informants (8) provided an equivalent of the adverb casi premodifying the adjective unánime: 6 participants chose the appropriate equivalent almost whereas the other two produced near, which might have been influenced by their likely confusion between the adverbs near and nearly.

Finally, it seems worth mentioning that four informants produced free translations that do not resemble the Spanish structure:
(42) Agreement between both methods was almost unanimous ${ }^{104}$.
(43) Both methods showed almost the same result.
(44) Two methods led to almost the same results.
(45) The two methods reached an (?) in practice unanimous agreement.

Except for examples (42) and (45), which show structures which were not found in any of the reference corpora (i.e. *in practice, *the agreement was almost

[^70]unanimous ${ }^{105}$ ), the other two examples (43 and 44) constitute appropriate expressions from a collocational point of view. What could be argued, however, is whether the free translations provided are faithful to the original sentence and to what extent they convey the same meaning as the HSC instance. The inclusion of the noun phrase results incorporates a new information topic not mentioned in the original sentence and, as a consequence, suggests that informants were interpreting, rather than merely translating the Spanish construction. Although these two examples should then be labelled as inappropriate equivalents, they undoubtedly show that informants tried to avoid the difficulty of translating the impersonal construction with the reflexive pronoun se into English.

A number of other deviations in lexical bundles could also be traced in sentence 3, where informants' translation equivalents of the Spanish expression en resumen were examined.

Sentence 3: En resumen, los resultados de nuestros estudios sugieren que la vaginitis bacteriana no afecta en absoluto a la concepción

HSC example: In conclusion, findings from our studies suggest that bacterial vaginosis has no influence on conception.

All informants considered the Spanish construction en resumen as a clear distinct unit understood as a whole and separated from the rest of the text by means of a comma. Unlike what was observed in the analysis of informants' translation of the lexical bundle "there + be + (adjective) agreement", the string en resumen seems to have been interpreted as an extended unit of meaning which serves the function of a discourse marker, i.e. introducing the summary of what has already been discussed, and, consequently, all translations, but for three ungrammatical cases: *as summary, *in resume and *summing, referred to frequently used formulae when expressing summaries and overt evaluations in academic writing. Some of these expressions, however, were not found in the HSC corpus, as Table 26 shows:

[^71]| HSC |  | Informants' data |
| :---: | :---: | :---: |
| (97 occurrences) <br> (65 occurrences) <br> (9 occurrences) | In summary, (11 occurrences) <br> In conclusion, (6 occurrences) <br> To summarize, (1 occurrence) |  |
|  |  | *As summary, (1 occurrence) <br> To sum up, (1 occurrence) <br> *In resume, (1 occurrence) <br> To end, (1 occurrence) <br> *Summing, (1 occurrence) <br> *Summarising, (1 occurrence) |

Table 26 Lexical bundles used to introduce conclusions and summaries in the HSC and the informants' data

Figures above indicate that 18 out of 24 informants produced the most commonly used combinations in the native corpus to anticipate that the discourse was coming to an end; that is, in summary (11 informants), in conclusion (6 informants) and to summarize (1 informant). Some other translations provided should be either considered unlikely to be found in medical discourse (e.g. to sum up, to end) or clearly influenced by the informants' L1 (e.g. *summing, *summarising, *in resume and as summary).

While the confusion between in resume and in summary must partly be due to the fact that informants might have problems in distinguishing between the English resume and the Spanish resumen, the case of as summary is a clear example of transfer of structures from como and a modo de resumen. Likewise, summing and summarising, each of which was produced by one informant, might have been influenced by the colloquial forms "resumiendo, en resumidas cuentas".

It can be concluded that although most informants were successful in producing appropriate equivalents for the lexical bundle en resumen, some other deviant translations give account of their transfer of structures from their L1.
b) Informants' use of the pattern restricted verb + comparison

The analysis of sentences 2 and 6 (see below) was aimed at finding out whether the use of restricted verbs in combination with the abstract noun comparison was problematic for the group of informants under investigation. Before a more in-depth examination of the combinatorial patterns provided, it must be noted that the most striking feature revealed by the observation of both sentences refers to the fact that a high percentage of participants ( $30,4 \%$ in sentence 2 and $41,7 \%$ in sentence 6) produced inappropriate word forms of the lexical item comparison. This was not to be expected since that noun was common in scientific procedures and they had already been using it in the previous exercises. Thus, they were supposed to be familiar with its spelling. The following deviant forms, however, seem to support the assumption that when producing the word themselves some participants tended to use word forms that resembled the Spanish spelling:

| Sentence 2 | Sentence 6 |
| :---: | :---: |
| ${ }^{\text {}}$ comparations (5 informants) | ${ }^{\text {*comparation/s (7 informants) }}$ |
| ${ }^{*}$ comparitions (1 informant) | ${ }^{*}$ comparisions (2 informants) |
| ${ }^{*}$ comparisions (1 informant) | ${ }^{*}$ comparition (1 informant) |

Table 27 Deviant formal realisations of the noun comparison provided by informants in Sentences 2 and 6

Sentence 2: No se realizaron comparaciones para determinar diferencias de género ni de edad.
HSC example: Comparisons were not performed to determine gender or age differences.

As evidenced by informants' data, non-native speakers seemed to be aware of the most common restricted verb collocates associated with the abstract noun comparison in the HSC. The verb make, and to a lesser extent, do were produced by 21 informants. These are some examples:
(46) *Comparations to determine gender and age differences weren't done.
(47) No comparisons were made in order to determine age and gender differences.
(48) Comparisons to determine sex or age differences were not made.
(49) No comparisons were done about any differences of sex.

Regarding deviant uses of verbs collocating with comparison, there were only two informants who produced inappropriate word combinations with the verbs realise and be:
(50) *Did not realise comparisons to decide differences in gender and age.
(51) There were no comparisons to determine possible gender and age differences.

In addition, a high percentage of informants ( $83,3 \%$ ) expressed these verb-noun collocations by means of a passive construction, which was also typically observed in the native corpus (cf. section 4.5). One of these informants, however, had problems with the inflection of the "be passive" and produced a deviant instance:
(52) Comparisons to analyse differences of gender and age *didn't be made.

Among those who did not express the restricted verb-noun collocation in the passive form (12,5\%; 3 participants), it should be highlighted that, as illustrated in example (51) above, one informant made use of the existential there following the copular verb be, while the other two participants failed to provide grammatical instances since their translations either lacked a syntactic subject (see example 51) or appeared to be word-for-word translations from their L1 (e.g. "comparisons didn't make to determine some differences nor gender neither age").

With reference to the second half of the sentence introducing the purpose of the comparisons made; that is, "para determinar diferencias de género ni de edad" / "to determine gender or age differences", two main points must be underlined. On the one hand, although most informants (21) proved to be familiar with the subordinator to (18) / in order to (3) introducing the purpose adjunct ${ }^{106}$ that followed the noun comparison (examples (53-55) below), there were also two

[^72]deviant instances where the purpose adjunct turned into a prepositional phrase introduced by the preposition about (see example (56)) or an "-ing clause" (see example (57)):
(53) Comparisons were not made to determine differences between sexes and ages.
(54) No comparisons to detect differences in gender *nor age were done.
(55) No comparisons were made in order to determine age and gender differences.
(56) No comparisons were done about any differences of sex.
(57) Comparisons analyzing gender and age differences were not made.

On the other hand, an area that was of particular difficulty concerns the free verbs provided in combination with the noun differences. Although these deviant uses go beyond the scope of the present study, it should be at least mentioned that most free verb-noun collocations with the noun differences expressed by informants (e.g. assess differences, decide differences, reach differences, probe differences) were not found in the HSC corpus.

Sentence 6: Se hicieron las mismas comparaciones en los tratamientos de control.
HSC example: The same comparisons were made in the control treatments.
As stated in the analysis of informants' translations in sentence 2, deviations in the restricted verb produced were hardly found. 16 informants produced the collocation make comparisons, 6 used the support verb do (i.e. do comparisons) and one informant provided the verb perform as a translation equivalent of the Spanish hacer (see examples (58-60) below). The only deviant instance refers to a free translation where some misunderstanding of the original is noticeable (example (61)):
(58) The same comparisons were made in the control treatments.
(59) Same comparisons were done in control treatment.
(60) Similar comparisons were performed between control treatments.
(61) In control groups the *comparations were the same.

The most striking case of deviation concerning the pattern "verb + comparison" in this sentence is the difficulty encountered by some informants (5) when translating the impersonal reflexive pronoun "se" into English. Unlike sentence 1, where the overall numbers suggested that this was a particularly difficult area for informants, the percentage of deviant translations of the Spanish se in Sentence 6 is much lower. While most participants made use of a passive construction, in which the noun comparisons was the subject, so as to express the impersonality conveyed in Spanish by means of an impersonal pronoun (examples (62-63)), five informants produced syntactically (i.e. problems with notional subject-verb agreement, e.g. "it was made *comparations") and/or morphologically deviant (e.g. *comparation, *comparations) translation equivalents:
(62) In control treatments the same comparisons were made.
(63) The same comparisons were done in the control treatments.
(64) *They made the same *comparation in the control treatment.
(65) *It was made the same comparisons in the control treatments.
(66) *It was made similar *comparations on control treatments.
(67) *They did the same comparisons in the control treatments.
(68) *They made the same *comparations in the control treatments.

In examples (64), (67) and (68) above an unspecified personal pronoun (i.e. they) was used as the subject of comparisons, whereas in examples (65) and (66) an impersonal it was produced so as to fill the same subject position. These two deviant constructions emphasise the fact that, as noted by Neff van Aertselaer (2008), the translation of Spanish se structures into English passive sentences poses certain problems for non-native speakers and, thus, some transfer of structures from their L1 becomes evident.
c) Informants' use of the verb contribute vs. the noun contribution

Since the restricted verb + noun collocations analysed in the present investigation corresponded to a morphologically related verb (i.e. reach an agreement ~ agree; make a comparison ~ compare; draw a conclusion ~ conclude; make a contribution ~ contribution; make a decision ~ decide), it
seemed worth investigating whether the collocational patterning of those cognate verbs would also be a difficult area for non-native speakers. To this respect, sentence 4 attempted to inform about participants' command of the lexical verb contribute in combination with the adverb significantly, which had proven to be a common collocation in the HSC. Similarly, the word string significant contribution was also frequently found in the native corpus.

Sentence 4: Las sustancias analizadas han contribuido de forma poco significativa a disminuir los síntomas de la enfermedad.
HSC example: The analysed substances have not contributed significantly to lessen the disease symptoms.
While 17 informants produced the verb contribute as the translation equivalent of the Spanish contribuir, 5 participants made use of a periphrastic structure of the type "restricted verb + contribution" and the other two informants provided inappropriate translations: one, with the ungrammatical adjective *significative (e.g. "the contribution of analysed substances is marginally *significative") and the other, with a free verb (i.e. affect) which changed the meaning of the original (e.g. "the analyzed substances have not significantly affected the symptoms of the disease").

On the one hand, in those five instances where a restricted verb-noun collocation was produced, make stands out as the most commonly used (4 occurrences), which goes in line with the observations made in the HSC corpus (cf. section 4.6), whereas the deviant verb collocate, have, was only produced once (cf. example (73)):
(69) [...] analyzed substances have made a poor significant contribution to [...]
(70) The substances *analized have made a little *significative contribution to diminish [...]
(71) The analized substances have made a little significant contribution in decreasing the symptoms of the disease.
(72) The *analized *substans have made a contribution in a short *significative way to decrease the illness *symthoms.
(73) The analyzed substances *have a little contribution to diminish the symptoms of the disease.

On the other hand, the seventeen instances where the verb contribute was provided show that informants had no difficulty in identifying the English equivalent of the Spanish dummy preposition "a" since all their translations contained the preposition "to" following the lexical verb (i.e. "contribuir a" vs. "contribute to"). Consequently, data suggest that most informants seemed to be aware of both the usual support verb in combination with the abstract noun contribution as well as the dummy preposition following its cognate verb contribute.

What seems to be particularly difficult in this sentence, however, is the translation of the Spanish phrase "de forma poco significativa". Figures are revealing: only three informants produced either the appropriate adverb equivalent in English, i.e. significantly, in the structure "contribute significantly to" (2 informants) or the adjective significant premodifying the noun contribution in verb-noun constructions. The other twenty-one examples are clear attempts at providing literal translations of the Spanish structure and also give account of the fact that the most problematic element in the string "de forma poco significativa" appeared to be the Spanish adverb poco.

As a further indication of informants' inclination to word-for-word translations, it seems worth noting that only 5 of their productions were expressed in the negative form of the verb contribute, as was the case in the HSC example:
(74) The tested substances have not contributed to diminish [...]
(75) The *analized substances haven't contributed in a significant way to decrease [...]
(76) The tested substances have not contributed significantly to relief [...]
(77) The substances studied don't contribute to decrease [...]
(78) The analyzed substances have not significantly affected the symptoms of the disease.

This finding is especially relevant because the original sentence in Spanish was declarative and, in fact, it was the prepositional phrase "de forma poco
significativa" what provided the sense of "lack of contribution of the analysed substances".

On the contrary, 13 informants produced the verb contribute in the affirmative form and, as a consequence, found it very difficult to translate the word string "de forma poco significativa" in English. Rather than producing the verb in its negative form in combination with the adverb significantly (i.e. "[...] have not contributed significantly to [...]'), informants seem to have referred back to their L1 by providing a literal translation of the original.

As can be seen in the examples below, such literal translations often consisted of deviant structures which made it evident not only informants' unawareness of the morphological form of the adjective significant, as well as its adverb counterpart, significantly, (see examples (79-83)) but also the problems posed by the adverb poco:
(79) Analysed substances have contributed in a few *significative way to diminish disease symptoms.
(80) The *analized substances have contributed to minimize the illness symptoms in a little *significative way.
(81) Analysed substances have contributed not much *significant to decrease the symptoms.
(82) The *analized *substans have made a contribution in a short *significative way to decrease the illness symthoms.
(83) The substances analized have made a little *significative contribution to diminish the disease symptoms.
(84) Analyzed substances have made a *poor significant contribution to decrease disease symptoms.
(85) Substances analyzed have *poor significantly contributed to reduce disease symptoms.
(86) The *analized substances haven't contributed in a significant way to decrease the symptoms of the disease.
(87) Analyzed substances have contributed a little to decrease the symptoms of the illness.
(88) Analysed substances have *contribute to decrease disease *synthons ?in a limited way.
(89) The analyzed ?compounds have ?poorly contributed to lessen the symptoms of the disease.
(90) The *analised substances had contributed in ?poorly significant form to decrease the illness symptoms.
(91) The substances analyzed have contributed only slightly to reduce the symptoms of the illness.
(92) The analyzed substances have contributed in a not very significant way to diminish the illness symptoms.

The translation equivalents of the Spanish adverb poco provided by informants in their literal translations deserve further attention. Data from both the HSC and the $B N C$ had revealed that the adjectives significant, substantial, small, large ${ }^{107}$ and little, as well as their corresponding adverbs, i.e. significantly, substantially, largely and little, were usual collocates of the noun contribution and its cognate verb contribute, respectively. No instance of short, poor/poorly or a few could be traced in the native corpora. However, examples (79), (84), (85), (89) and (90) above suggest that informants failed to distinguish between short / small / little and a few and might have perceived them all as equivalents of the Spanish node word poco. Likewise, the deviant use of poor/poorly might have also been regarded as a synonym of little (poco, in Spanish).

Looking at the grammatical use that emerges from the non-native translations of sentence 4, it seems plausible that informants are not aware of the different collocational patternings of English quantifiers, such as a few, a little and not much. In addition, most of their morphologically (e.g. *significative) and semantically (e.g. *in a short significative way, *in poorly significant form) deviant instances were highly influenced by their L1 and, thus, revealed their lacking collocational competence. Further examples of this tendency can also be traced in the following analysis.

[^73]
## d) Informants' command of the patterns associated with the noun conclusion

In order to get an overview of the main difficulties informants encountered when dealing with the phraseological patterns associated with abstract nouns in medical English, Exercise 3 contained two examples of the abstract noun conclusion in combination with restricted and free verb collocates (sentences 5 and 7, respectively). Besides, the abstract noun in both sentences was premodified by an adjective, which provided very useful information regarding informants' knowledge of the most common adjective collocates of the noun conclusion.

Sentence 5: Antes de que se pueda llegar a conclusiones fiables, los investigadores deben aprender mucho más acerca de la función genética.

HSC example: Before firm conclusions can be made, researchers must learn much more about genetic function.

The number of restricted verb collocates produced as equivalents of the Spanish "llegar a" in combination with the noun conclusion proved to be higher than the support verbs found in the HSC corpus. See the following Table:

| HSC | Informants' data |
| :---: | :---: |
| draw |  |
| lead to | reach (14 informants) |
| reach | obtain (3 informants) |
| make | make (2 informants) |
| arrive at | lead to (1 informant) |
| come to | draw (1 informant) |
|  | have (1 informant) |
|  | get (1 informant) |
|  | achieve (1 informant) |

Table 28 Restricted verb collocates + conclusion in the HSC and the informants' data (Sentence 5)

As can be inferred from the data in Table 28, the most frequently used verb was reach (14 informants), which was also very common in the HSC, and to a much lesser extent, other verbs like make (1 informant), lead to (1 informant) and
draw (1 informant) were also produced by informants. However, some deviations in the verb could also be traced in examples like the following:
(93) Before *to obtain reliable conclusions, the investigators must learn much more about genetic function.
(94) Before having_better evidence, researchers have to learn much more about genetic functions.
(95) Before *to get reliable conclusions, the researchers must learn much more about the genetic function
(96) Before *to achieve reliable conclusions, researchers must learn more about genetic function.

In addition to the question of what kind of verbs were most commonly chosen by informants, it was also worth investigating whether they were aware of the type of constructions those verbs typically occurred in. Data from the HSC corpus (cf. section 4.3) had shown that whereas the verbs draw and make tended to occur in the passive, the verb reach when combining with the noun conclusion was frequently used in active constructions in which the phrase performing the role of subject was referred to demonstrable and evident data (e.g. studies have reached conflicting conclusions, previously published studies could not have reached this conclusion) rather than to animate volitional entities.

Bearing in mind that 14 out of 24 informants chose the collocation reach a conclusion in their translations of "llegar a una conclusión", the fact that the active voice was very frequently used resembles the HSC findings. However, a closer look at the examples reveals that some deviations also took place:
(97) Before we can reach firm conclusions, researchers must learn much more about genetic function.
(98) Before *it could reach reliable conclusions, the research team must improve *his knowledge about the genetic function.
(99) Before we can draw reliable conclusions, investigators must learn much more about genetic function.
(100) Before they obtain valid conclusions, the investigators must learn much more about genetic function.

Probably due to the fact that the Spanish sentence contained an impersonal se construction, informants found it difficult to provide a suitable subject in their English translations and, thus, certain pronouns like we, it and they (see examples (97-100)) were used to refer anaphorically to "researchers, investigators or the research team". As stated above, this type of personal subjects was hardly found in the native corpus since the use of passive constructions (e.g. "conclusions were made/ drawn") served to avoid expressing the animate agent of the action. Likewise, the active structures in which the verb reach typically occurred did not include personal pronouns occupying the subject position in the HSC. Thus, examples like (97), (99) and (100) above were not characteristic of the medical discourse.

Other informants (15) managed to avoid the problem caused by the Spanish reflexive pronoun se by producing a non-finite clause following the preposition before. These are some examples:
(101) Before reaching reliable conclusions investigators must learn more about the genetic function.
(102) Before *to obtain reliable conclusions, the investigators must learn much about genetic function.
(103) Before *reach a reliable conclusion, researchers must learn much more about genetic function.
(104) Before having better evidence, researchers have to learn more about genetic function.
(105) Before *to achieve reliable conclusions, researchers must learn more about genetic function.

The use of a non-finite clause following the preposition before illustrated in the above examples might have been perceived as a safe option since it allowed no explicit specification of the subject. However, some expressions like "before + to obtain /reach/ to achieve" made it evident informants' lacking awareness of the expected verb form following a preposition in English. A total of 8 participants
produced deviant examples with both the "to-"and the bare infinitive, where a gerund would have been expected.

Regarding the use of the passive, it must be stressed that it was hardly used in this sentence. Only 4 informants provided a passive construction to translate the Spanish "antes de que se pueda llegar a conclusiones fiables". Interestingly, among these very few uses of the passive, the verb reach was again the most frequently selected. The following examples illustrate such a preference:
(106) Before reliable conclusions can be reached, the researchers must learn more about the genetic function.
(107) Before reliable conclusions could be reached, investigators should learn more about the genetic function.
(108) The researchers have to learn much more about genetic function, before reliable conclusions can be reached.

This overt use of the verb reach to the detriment of other possible restricted verb collocates like draw, make and lead to appeared to be influenced by the fact that informants might perceive the literal meaning of reach as closer to the Spanish "llegar a" and, thus, the former would be seen as a more accurate translation equivalent. Again, this further indicates their preference for literal translations and underlines the difficulties that the use of verbs in figurative senses entails.

Another final issue to be looked at refers to the informants' translation equivalents of the adjective "fiables" modifying the noun conclusion. Out of 22 instances of evaluative adjectives (i.e. reliable, firm, valid and *verificable ${ }^{108}$ ) preceding the node word, 19 included the adjective reliable whereas the other three adjectives were only produced once. These findings do not resemble what was observed in the native corpus. The HSC did not show any occurrence of the collocation reliable conclusions and, by comparison, only two instances of this word combination were traced in the BNC. On the contrary, the most likely

[^74]equivalent of "conclusiones fiables", that is, "firm conclusions" was only expressed by one informant:
(109) Before we can reach firm conclusions, researchers must learn much more about genetic function.

The present data thus suggest that informants' collocational performance with respect to the most usual premodifiers of the noun conclusion show little correspondence with native-like written production.

Sentence 7: Estas conclusiones biológicas han sido justificadas por múltiples tipos de análisis estadísticos.

HSC example: These biological conclusions are justified by multiple types of statistical analyses.
The most common deviation observed in this sentence that sticks out as being especially difficult for informants is related to morphological issues. Interestingly, seven participants produced an inappropriate word form for the adjective biological (i.e. *biologyc). Unlike the evaluative adjective firm discussed in sentence 5, the topical adjective biological in the current example was not expected to pose problems for the non-native speakers in this study as they were supposed to be familiar with such a classifying adjective, so widely spread as a general term among the medical community.

In the same line, morphological deviations were also traced in the most commonly used free verb collocate selected by sixteen informants; that is, the verb justify. Although participants did not seem to have problems in providing an appropriate equivalent of the Spanish word string "justificar una conclusión" (i.e. justify a conclusion), partly because both the English and the Spanish verbs are morphologically related, a total of five informants produced ungrammatical inflected forms of the passive participle of the verb justify (i.e. *justifiqued, *justificated and *justifyed):
(110) These conclusions have been *justificated by multiple types of statistical analysis.
(111) These biological conclusions have been *ustifyed by a lot of kinds of statistical analysis.
(112) *This biological conclusions have been *iustificated by several kinds of *stadistical analysis.
(113) *This biological conclusions have been *ustifiqued for a lot of different *stadistics ways.
(114) These biological conclusions were *ustifiqued by different statistical analysis.

Other free verb collocates expressed by informants were support (5 instances) and verify (1 instance):
(115) These biological conclusions have been supported by multiple types of *stadistical analysis.
(116) The *biologyc conclusions have been *verificated ${ }^{109}$ by a lot of types of statistical analysis.

Comparing the constructions produced by informants against the original HSC example, it should also be pointed out that a high percentage $(91,7 \%$ ) of instances were of both the Spanish sentence and the HSC instance were expressed in the passive form. Only two informants provided free translations in the active voice by changing the focus of attention from the conclusions to their causer (i.e. statistical analyses):
(117) *To many statistical analysis led to these biological conclusions.
(118) Multiple statistical analyses support these biological conclusions.

All in all, as the examples above show, the free combination examined in this sentence (i.e. justify a conclusion) was by no means a particularly problematic area for non-native speakers since both the HSC example and the Spanish translation were very similar (i.e. the verb in both cases was morphologically related and both sentences were expressed in the passive). What seemed to be more complex, on the contrary, was the morphology associated not only with

[^75]the passive participle of the lexical verb provided (i.e. justified and verified) but also with the adjective collocate (i.e. biological) of the noun conclusion.
e) Informants' knowledge of the compound decision making

As already discussed in chapter 4, the abstract noun decision tended to occur in combination with some other nouns (e.g. decision rules, decision point, decision model, decision making), giving rise to the creation of compounds. Therefore, it seemed worth investigating how informants would deal with the production of those structures. The compound noun selected for this analysis was decision making.

Sentence 8: Varias organizaciones son las responsables de la toma de decisiones por lo que respecta a la seguridad de las transfusiones.
HSC example: Several organizations are responsible for decision making in transfusion safety.

Given the fact that the translation equivalent of the endocentric compound decision making consisted of a periphrastic structure of the type "noun de noun combination" (i.e. "toma de decisiones"), rather than a compound lexeme made of two nouns, it was especially interesting to examine the expressions produced by informants.

Of the 24 instances, only 6 included the compound decision making as the translation equivalent of the Spanish "toma de decisiones", whereas sixteen ${ }^{110}$ informants made use of other types of constructions, such as "-ing" clauses or simple nouns. These are some examples:
(119) Several *organitations are responsible *of making of decisions about security in transfusions.
(120) Several organizations are responsible for making decisions about transfusions security.
(121) Some *boureaus are *responsibles *of the decisions taken about transfusion safety.

[^76](122) Various organisations are responsible for taking the decision with respect to the safety of transfusion.
(123) Several organizations are responsible *in taking decisions about transfusion security.
(124) Some organizations are *responsable for making decisions regarding the security of transfusions.

The fact that most of the expressions created were periphrastic structures (i.e. taking decisions about, making decisions with respect to, making decisions about) instead of a compound (i.e. decision making), as it would have been more appropriate, suggests not only the informants' unawareness of the English compound, but also their general tendency to provide word-for-word translations. A clear example of this can be observed in example (119), where the word string "making of decisions" is in sharp correlation with the Spanish expression "toma de decisiones".

With respect to the support verbs being used in the informants' constructions, it should be highlighted that the restricted verb collocates make and take stand out as the most commonly used (5 and 6 occurrences, respectively), as was the case with the verb-decision collocations observed in the HSC. There were only two instances of deviant verb-noun collocations in informants' translations:
(125) *Very organisations are the *responsables *of the doing decisions about transfusions security.
(126) Regarding *to transfusions safety. Several organizations are responsible for *to adopt decisions.

Example (125) contains an inappropriate use of the support verb do, which was not traced in combination with decision in the HSC, whereas in example (126) a deviant use of the free verb collocate adopt can be observed.

From the analysis of informants' periphrastic constructions, another aspect that also emerges as being particularly susceptible to deviation is their translations of the lexical bundle "por lo que respecta a". As noted in section 4.7, the noun
decision was hardly ever postmodified ${ }^{111}$ by a prepositional phrase supplying information about the content of the decision made. However, in all informants' periphrastic structures (see examples (119-124)), the noun decision was postmodified.

Unlike the HSC where the only prepositions following the noun decision were about and on, the translation equivalents suggested by informants included a wider range of prepositions. Examples with the number of occurrences in square brackets are:
(127) Several organizations are responsible for making decisions about [9] safety of transfusions security.
(128) Several organisations are responsible for decision making with respect to [7] transfusion security.
(129) Several organizations are responsible for taking decisions regarding [2] blood transfusions safety.
(130) Several organizations are responsible of decision-making concerning [1] security of transfusions.

As can be seen in the examples above, a total of 10 informants made use of prepositions that had not been found in combination with the noun decision in the HSC (e.g. with respect to, regarding and concerning). However, they appear to refer literally to the Spanish "por lo que respecta a ". This ties in well with the earlier observation that informants showed a stronger preference for literal translations.

To sum up, the findings concerning informants' command of the compound decision making in sentence 8 suggest that most of their expressions are influenced by their L1 and thus constitute a further group of deviant collocations. In the following pages, participants' lexico-grammatical competence with regard to adjective-abstract noun and verb-abstract noun patterns will be discussed in the light of the results obtained in Exercises 1 and 4 , respectively.

[^77]
### 5.1.3 Matching Exercise (adjective + abstract noun)

```
Exercise 1. Match each of the adjectives on the left with a suitable noun from the
    facing column. Try to use your intuition. Please notice that more than
    one combination is possible and some of the adjectives can be left
    out. }\mp@subsup{}{}{112
logical, clear, firm, contradictory, valid, little
reliable, short, late, statistical, far-reaching
substantial, general, significant, large, small
fashionable, broad, unforeseeable
```

+ conclusion/ agreement/ comparison/ contribution/decision

In Exercise 1 informants were asked to associate nineteen adjectives with the five abstract nouns analysed in this study (i.e. agreement, comparison, conclusion, contribution and decision). It was clearly stated in the instructions of the exercise that several combinations were possible; that is, each noun from the list provided could be matched with more than one adjective. Equally, they were told that some adjectives could be left out.

The main goal of this exercise was thus to analyse informants' intuition and performance with respect to certain adjectives collocating with a selection of abstract nouns, on the one hand, and comparing their associations against the actual collocations found in the HSC, on the other. Some conclusions concerning the participants' command of the adjective collocates in combination with abstract nouns will be drawn from such a comparison.

As pointed out in chapter 3, the selection of the nineteen adjectives discussed here (see Appendix 4) was determined by the fact that, with the only exception of four of them (i.e. contradictory, fashionable, short and unforeseeable), the rest had been found to be frequent collocates of at least one of the abstract nouns under study. The important point to make regarding the other four adjectives included is that none of them could be found in the corpora used for comparison (i.e. the HSC and the BNC). The focus of this exercise was then analysing how proficient informants were in dealing with these adjective collocates.

[^78]On the contrary, Exercise 1 was not expected to provide information about the participants' expertise in adjective order in English, which means they were not supposed to specify whether the adjectives provided tended to appear in either attributive or predicative positions. Given the layout of the exercise (cf. Appendix 4$)^{113}$, though, it is likely that they may have interpreted the clause pattern adjective + noun (e.g. "there was general agreement"), that is, the adjective appearing in an attributive position, rather than the predicative structure Noun Phrase + copular Verb + Adjective Phrase (e.g. "the contribution was substantial').

It had already been noted in chapter 4 that both descriptors and classifiers could be found adding some features to abstract nouns. However, the latter were more prone to collocate with the following nouns: comparison, contribution and decision. The abstract nouns agreement and conclusion, on the contrary, showed a stronger preference for evaluative, extent and time descriptors as premodifiers. As previously discussed in section 4.8, classifiers are seen to be more predictable in a medical register since academic writing in empirical research is chiefly focused on demonstrable data rather than on personal evaluations and opinions, expressed by means of qualitative descriptors, which are more typical of literary writing (Swales 1990; Halliday \& Martin 1993; Biber et al. 1998/1999; Gledhill 2000; Hyland 2008).

As a consequence, doctors were expected to be more used to identifying relational and topical adjectives (classifiers) with abstract nouns (e.g. statistical comparison, cellular contribution, clinical decision) since this kind of collocates were highly frequent in medical writing. However, what would their performance be like when dealing with descriptors? The focus here lies on analysing how they would deal with evaluative and size adjectives (descriptors), less frequently found in the HSC, in combination with the abstract nouns under discussion. The following Table shows Biber's et al. (1999) classification of the adjectives selected for Exercise 1:

[^79]| DESCRIPTORS |  |  | CLASSIFIERS |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| EVALUATIVE | SIZE | EXTENT | TIME | RELATIONAL | TOPICAL |
| LOGICAL | LITTLE | GENERAL | LATE | FAR-REACHING | STATISTICAL |
| CLEAR | SHORT*$^{*}$ | BROAD |  |  |  |
| FIRM | LARGE |  |  |  |  |
| CONTRADICTORY* | SMALL |  |  |  |  |
| VALID |  |  |  |  |  |
| RELIABLE |  |  |  |  |  |
| SUBSTANTIAL |  |  |  |  |  |
| SIGNIFICANT |  |  |  |  |  |
| UNFHIONABLE* |  |  |  |  |  |

Table 29 Semantic classification of the adjectives ${ }^{114}$ selected in Exercise 1

Most adjectives from Exercise 1 were evaluative descriptors. The fact that their frequency of appearance in the HSC was fairly low in comparison with classifying adjectives made it very difficult to follow Halliday's (1961) \& Sinclair's (1991) "statistical / textual approach"115 to the measure of frequency as the sole indication of collocational significance. To put it another way, if judged by frequency of occurrence the adjective collocates used in this exercise would not be regarded as significant collocates of the HSC, since classifiers have proven to be much more frequent in combination with three (i.e. comparison, contribution and decision) of the five abstract nouns analysed here. The main goal of the present exercise, however, was not verifying that evaluative adjectives tended to co-occur with abstract nouns less often than classifiers in medical writing. On the contrary, the focus of attention was analysing whether the informants were able to identify the evaluative adjectives most frequently used in combination with the abstract nouns provided so as to show their knowledge of the limited number of opinion collocate adjectives found in the reference corpora.

Altogether, the results of the data analysis that follow are mainly quantitative; indicating in brackets the numerical findings of the frequency of occurrence of

[^80]each adjective + noun collocation. The low percentage of occurrence of some evaluative adjectives with abstract nouns in the HSC (see Table 31) forced through some methodological decisions, as was already pointed out in chapter 3. Bearing in mind that very modest conclusions could be drawn from comparing the informants' collocates with the adjective collocates extracted from the HSC, it was decided to use the British National Corpus (BNC) as a third comparison measure. As a 100 million word collection of samples of written and spoken language from a wide range of sources, the BNC provided a higher context of co-occurrence and enabled to reach more significant conclusions as well.

Prior to the comparison of results, several searches needed to be made. Firstly, it was necessary to establish what adjectives from the list collocated with each of the abstract nouns, both in the BNC and the HSC, so as to determine whether they were found to appear in combination and, if so, its frequency of occurrence. Secondly, the sample from the twenty-four informants was individually analysed. Tables 30, 31 and 32 below show a detailed account of the adjective collocates found in the BNC, the HSC and the informants' answers to Exercise 1, respectively.

| AGREEMENT | COMPARISON | CONCLUSION | CONTRIBUTION | DECISION |
| :---: | :---: | :---: | :---: | :---: |
| GENERAL(268) | GENERAL(3) | GENERAL(52) | GENERAL(1) | GENERAL(1) |
| BROAD (49) | BROAD (2) | BROAD(2) |  |  |
| LITTLE(20) | LITTLE(5) |  | LITTLE(8) | LITTLE(1) |
| CLEAR(11) |  | CLEAR(14) |  | CLEAR(20) |
| SUBSTANTIAL(7) |  |  | SUBSTANTIAL(54) |  |
| FIRM(6) |  | FIRM(12) |  | FIRM(27) |
| SIGNIFICANT(4) | SIGNIFICANT(2) | SIGNIFICANT(2) | SIGNIFICANT(161) | SIGNIFICANT(4) |
| FAR-REACHING(2) |  |  |  |  |
| $\operatorname{VALID}(1)$ | VALID(6) | VALID(2) | VALID(3) | VALID(1) |
| LARGE(1) |  |  | LARGE(12) |  |
|  | STATISTICAL(10) |  |  | STATISTICAL(1) |
|  | LOGICAL(2) | LOGICAL(90) |  | LOGICAL(5) |
|  | SMALL(1) |  | SMALL(15) |  |
|  |  | RELIABLE(2) |  |  |
|  |  |  | FASHIONABLE(1) |  |
|  |  |  |  | LATE(7) |

Table 30 Adjective collocates in combination with agreement / conclusion / comparison / contribution / decision extracted from the BNC

| AGREEMENT | COMPARISON | CONCLUSION | CONTRIBUTION | DECISION |
| :---: | :---: | :---: | :---: | :---: |
| GENERAL(12) |  | GENERAL(3) |  |  |
| BROAD (1) | BROAD (1) |  |  |  |
| LITTLE(1) |  |  | LITTLE(1) |  |
| SIGNIFICANT(1) | SIGNIFICANT(1) |  | SIGNIFICANT(10) |  |
|  | RELIABLE(3) |  |  |  |
|  | VALID(5) |  |  |  |
|  | STATISTICAL(15) |  |  |  |
|  |  | FIRM(4) |  | FIRM(2) |
|  |  | LOGICAL(1) |  |  |
|  |  |  | SUBSTANTIAL(3) |  |
|  |  |  | SMALL(2) |  |
|  |  |  |  | CLEAR(2) |
|  |  |  |  | FAR-REACHING(1) |

Table 31 Adjective collocates in combination with agreement / conclusion / comparison / contribution / decision found extracted from the HSC

| AGREEMENT | COMPARISON | CONCLUSION | CONTRIBUTION | DECISION |
| :---: | :---: | :---: | :---: | :---: |
| GENERAL(12) | GENERAL(3) | GENERAL(9) | GENERAL(6) | GENERAL(3) |
| BROAD (8) | BROAD (1) | BROAD (5) | BROAD (7) | BROAD (3) |
| LITTLE(6) | LITTLE(2) | LITTLE(2) | LITTLE(7) | LATE(8) |
| VALID(6) | VALID(9) | VALID(13) | VALID(6) | VALID(6) |
| RELIABLE(6) | RELIABLE(2) | RELIABLE (10) | RELIABLE(3) |  |
| FIRM(5) |  | FIRM(13) | FIRM(1) | FIRM(15) |
| SUBSTANTIAL(4) |  | SUBSTANTIAL(1) | SUBSTANTIAL(18) |  |
| LATE(4) | LATE(1) | LATE(3) | LATE(3) |  |
| UNFORESEEABLE(4) | UNFORESEEABLE(2) | UNFORESEEABLE(5) | UNFORESEEABLE(2) | UNFORESEEABLE(5) |
| CLEAR(3) | CLEAR(2) | CLEAR(12) | CLEAR(5) | CLEAR(5) |
| SIGNIFICANT(3) | SIGNIFICANT(4) | SIGNIFICANT(4) | SIGNIFICANT(13) | SIGNIFICANT(2) |
| FAR-REACHING(3) | FAR-REACHING(3) | FAR-REACHING(6) | FAR-REACHING(4) | FAR-REACHING(5) |
| LARGE(3) | LARGE(3) |  | LARGE(10) |  |
| LOGICAL(3) | LOGICAL(7) | LOGICAL(16) | LOGICAL(2) | LOGICAL(12) |
| FASHIONABLE(1) | FASHIONABLE(2) |  |  | FASHIONABLE(3) |
| SHORT(1) | SHORT(3) | SHORT(2) | SHORT(6) | SHORT(1) |
|  | SMALL(3) | SMALL(1) | SMALL(11) |  |
|  | STATISTICAL(21) | STATISTICAL(2) | STATISTICAL(1) |  |
|  | CONTRADICTORY(7) | CONTRADICTORY(12) | CONTRADICTORY(1) | CONTRADICTORY(7) |
|  |  |  |  |  |
|  |  |  |  |  |

Table 32 Adjective collocates in combination with agreement / conclusion / comparison / contribution / decision found extracted from the informants' sample

The information displayed in the above Tables (30, 31 and 32) was so varied that comparisons among them seemed difficult to make. Therefore, a method of sampling on the basis of frequency of occurrence was adopted for practical reasons and an initial cut-off of the six highest frequency adjective collocates in the $B N C$, the HSC and the informants' sample was imposed. This gave rise to a more manageable number of collocates:

| BNC | HSC | Informants' responses to Ex. 1 |  |
| :---: | :---: | :---: | :---: |
| GENERAL(268) | GENERAL(12) | GENERAL(12) | AGREEMENT |
| BROAD (49) | BROAD(1) | BROAD (8) |  |
| LITTLE(20) | LITTLE(1) | LITTLE(6) |  |
| CLEAR(11) |  |  |  |
| SUBSTANTIAL (7) |  |  |  |
| FIRM (6) |  | FIRM (5) |  |
|  | SIGNIFICANT(1) |  |  |
|  |  | RELIABLE(6) |  |
|  |  | VALID(6) |  |
| STATISTICAL(10) | STATISTICAL(15) | STATISTICAL(21) | COMPARISON |
| VALID(6) | VALID(5) | VALID(9) |  |
| LITTLE(5) |  |  |  |
| GENERAL(3) |  |  |  |
| LOGICAL (2) |  | LOGICAL(7) |  |
| SIGNIFICANT (2) | SIGNIFICANT(1) | SIGNIFICANT(4) |  |
|  | BROAD (1) |  |  |
|  | RELIABLE(3) |  |  |
|  |  | SHORT (3) |  |
|  |  | CONTRADICTORY(7) |  |
| LOGICAL(90) | LOGICAL(1) | LOGICAL(16) | CONCLUSION |
| GENERAL(52) | GENERAL(3) |  |  |
| CLEAR(14) |  | CLEAR(12) |  |
| FIRM(12) | FIRM(4) | FIRM(13) |  |
| VALID (2) |  | VALID(13) |  |
| SIGNIFICANT (2) |  |  |  |
|  |  | CONTRADICTORY(12) |  |
|  |  | RELIABLE(10) |  |
| SIGNIFICANT(161) | SIGNIFICANT(10) | SIGNIFICANT(13) | CONTRIBUTION |
| SUBSTANTIAL(54) | SUBSTANTIAL(10) | SUBSTANTIAL(18) |  |
| SMALL(15) | SMALL(2) | SMALL(11) |  |
| LARGE(12) |  | LARGE(10) |  |
| LITTLE (8) | LITTLE (1) | LITTLE (7) |  |
| VALID (3) |  | BROAD (7) |  |
| FIRM(27) | FIRM(2) | FIRM(15) | DECISION |
| CLEAR(20) | CLEAR(2) |  |  |
| LATE(7) |  | LATE(8) |  |
| LOGICAL(5) |  | LOGICAL(12) |  |
| SIGNIFICANT (4) |  |  |  |
| VALID (1) |  | VALID (6) |  |
|  |  | CONTRADICTORY(7) |  |
|  | FAR-REACHING(1) | FAR-REACHING (5) |  |

Table 33 Highest frequency adjective collocates in the BNC, the HSC and the informants'
sample

Table 33 above presents the six most frequent adjectives in combination with the abstract nouns under study in the BNC, the HSC and the informants' sample, with the totals for the number of occurrences added in brackets. Altogether, data reveal that similar adjectives are used in combination with the five abstract nouns across the three data sources. Overall, it appears that the latter identified general, broad and little as frequent collocates of agreement; statistical and valid as common collocates of comparison; logical in combination with conclusion; significant, substantial, small and little collocating with contribution and firm and logical, with decision. Thus, informants were in part successful in identifying those adjectives from the list that most frequently cooccur with the above mentioned abstract nouns in the native corpora.

In light of such results, it seems reasonable to state that these similarities between native speakers' performance (i.e. the BNC and the HSC) and nonnative speakers' production should be interpreted as informants being aware of the typical adjective collocates in the medical genre. There are thus indications that in some collocations informants chose the adjectives most commonly found in the adjective + noun pattern (e.g. general agreement, statistical comparison, valid comparison, logical conclusion, firm conclusion, significant contribution, firm decision), so they do not seem to have difficulties in identifying those collocations that occur with greater frequency (cf. Table 33). However, such assertion should be taken very cautiously since a more careful look at the data displayed in Table 33 reveals that certain word combinations of the type adjective + agreement / comparison / conclusion / contribution / decision are likely to cause problems for the group of informants.

Although they have proven to successfully detect the most usual collocates, it is worth underlining that participants have also associated a wide range of adjectives with each of the nouns provided. In fact, there were very few adjectives which were not included ${ }^{116}$ in their combinations. As Table 32 displays, 14 out of 19 adjectives were chosen by a minimum of three informants

[^81]in combination with agreement, 15 adjectives were associated with comparison, conclusion and contribution, and 12 modifiers were used as collocates of the abstract noun decision by more than one participant.

By comparing the above figures against data extracted from both the BNC (cf. Table 30) and the HSC (cf. Table 31), it can be seen that in both corpora the list of adjectives that collocate with the nouns provided is significantly smaller. As a consequence, close observations of the larger number of collocations produced by the non-native speakers, which often result in inappropriate word combinations, have revealed some inconsistencies in the informants' collocational competence, as far as the pattern adjective + abstract noun is concerned.

It must be remembered that Exercise 1 presented the various options in a decontextualized way; that is, informants were not required to establish either syntactic or semantic properties of the combinations found, which means they were not expected to be capable of setting the semantic differences, if any, between, for instance, little and small (little contribution vs. small contribution) or large and broad (large agreement vs. broad agreement). However, some of their choices provide information about their lacking knowledge of the above mentioned collocational patterns.

Focusing on those collocations not traced either in the BNC or in the HSC seemed to be more revealing than concentrating on their similarities. For instance, a striking feature regarding the use of adjective + noun collocations by non-native speakers is that some of the adjectives selected are very infrequent ones in the native corpora. The participants' sample demonstrates that the adjective reliable has been very frequently used in combination with conclusion (10) ${ }^{117}$, agreement (6) and contribution (3). The same could be said of the time descriptor late collocating with agreement (4), conclusion (3) and comparison (1).

[^82]However, such collocations have not been found in either of the two native corpora used for comparison in the present study. In fact, the evaluative adjective reliable was only found 3 times in combination with comparison (HSC), whereas the descriptor late only occurred 7 times in combination with decision (BNC). Interestingly, neither reliable comparison nor late decision occurred in any of the twenty-four questionnaires. Needless to say that some of the collocations provided by informants (e.g. reliable conclusion, late agreement) could be labelled as acceptable in the sense that they are grammatically accurate and idiomatically correct, though, as both native corpora suggest, they constitute unusual combinations in English.

By contrast, there is additional evidence that informants tended to collocate these nouns with inappropriate adjectives as well. As already stated in chapter 3 , four randomly selected adjectives were included in the study; namely, three opinion descriptors, contradictory, fashionable and unforeseeable and a size descriptor, short. None of these four adjectives could be identified as a collocate of any of the five abstract nouns considered in this investigation. On the one hand, it was expected that some informants would have difficulties in distinguishing between little, small and short, since they are similar in meaning and may have similar translations into Spanish (poco ~ little; pequeño ~ little, small, short). While the qualitative adjectives little and small occurred in the HSC in combination with agreement and contribution (e.g. little agreement, little contribution, small contribution), the descriptor short was not found collocating with any of the selected nouns.

The above mentioned initial expectation has proven to be true as the following data show a noticeable misunderstanding between little and short in the informants' production:

```
little agreement (6) \({ }^{118}\) vs. *short agreement (1)
little comparison (null) vs. *short comparison (3)
little conclusion (2) vs. *short conclusion (2)
```

[^83]little contribution (null) vs. *short contribution (6) little decision (null) vs. short decision (1)

It was deemed then necessary to investigate the above deviation in the adjective + noun pattern, which was particularly frequent with the example short contribution (6 informants). As can be seen in the examples above, both little and short were found in combination with agreement and conclusion in the non-native speakers' production. The combinations *short agreement and *short conclusion must be regarded as deviated examples since they are not possible collocations in English. Similarly, the occurrences of *short comparison (3) and *short contribution (6) reveal that the distinction between the adjectives little and short poses some problems for the informants involved. This assumption is also supported by the fact that, as noted in chapter 3 (section 3.5), both adjectives are close in meaning and may be translated into participants' L1 (i.e. Spanish) by means of similar terms, such as pequeño, poco and escaso.

Inappropriate uses of the strings contradictory, fashionable and/or unforeseeable + abstract noun also occur in the informants' data. Such deviated combinations were not expected since the semantic properties of these three adjectives do not refer to demonstrable and quantifiable data or phenomena characteristic of the usual description of scientific processes and results. Therefore, it was unlikely that informants would produce combinations such as *unforeseeable conclusion, *fashionable decision and *contradictory comparison, to name but a few. Noticeable is the wide range of deviant word combinations, such as *unforeseeable agreement, *contradictory comparison, and *fashionable decision. Table 34 below charts the examples of adjective + noun collocates only found in the informants' questionnaires.

| AGREEMENT | COMPARISON | CONCLUSION | CONTRIBUTION | DECISION |
| :---: | :---: | :---: | :---: | :---: |
| RELIABLE(6) <br> *UNFORESEEABLE(4) <br> LATE(4) <br> LOGICAL(3) <br> *SHORT(1) <br> FASHIONABLE*(1) | *CONTRADICTORY(7) <br> FAR-REACHING(3) <br> LARGE(3) <br> *SHORT(3) <br> CLEAR(2) <br> *UNFORESEEABLE(2) <br> *FASHIONABLE(2) <br> LATE(1) | *CONTRADICTORY(12) <br> RELIABLE(10) <br> FAR-REACHING(6) <br> *UNFORESEEABLE(5) <br> LATE(3) <br> LITTLE(2) <br> *SHORT(2) <br> STATISTICAL(2) <br> SUBSTANTIAL(1) SMALL(1) | *SHORT(6) CLEAR(5) FAR-REACHING(4) RELIABLE(3) LATE(3) LOGICAL(2) *UNFORESEEABLE(2) FIRM(1) *CONTRADICTORY(1) STATISTICAL(1) | *CONTRADICTORY(7) <br> *UNFORSEEABLE(5) <br> *FASHIONABLE(3) <br> BROAD(3) <br> SHORT*(1) |

Table 34 Adjective collocates ${ }^{119}$ only found in the informants' sample

Data from Exercise 1 demonstrate that informants on the whole were capable of identifying the highest frequency adjective collocates of the abstract nouns discussed in this research but, at the same time, they seemed to lack some collocational competence since they also produced some unexpected or even inappropriate word combinations. This fact serves to reinforce the idea that the informants' degree of unawareness of some typical adjectives in adjective + noun collocations may lead not only to the use of infrequent collocations but also to the production of inappropriate adjective collocates.

A second matching exercise was also included in the worksheet of exercises so as to test informants' performance with respect to the verb + abstract noun pattern. Like Exercise 1, this activity asked participants to combine lexical items, in this case a list of six light verbs with the nouns provided, which were not integrated as part of a text. Results obtained from their verb-noun collocations will be discussed below.

[^84]
### 5.1.4 Matching Exercise (verb + abstract noun)

$$
\begin{aligned}
& \text { Exercise 4. Make, draw, reach, lead to, take and do are highly-frequent verbs in } \\
& \text { English. They tend to combine with a wide range of words to form fixed } \\
& \text { expressions. Combine the words below with the verbs provided in the chart. } \\
& \text { E.g.: action, knowledge, a mistake }(\ldots)+\text { make/draw/ reach/ lead to/ take/do } \\
& (\ldots)^{120}
\end{aligned}
$$

This exercise attempted to investigate with what nouns deviations in the verb in verb-noun collocations occurred. As already noted, informants were given a chart of six highly-frequent verbs in English (i.e. make, draw, reach, lead to, take and do) and were asked to associate them with a list of thirty-six nouns that had been found to collocate with at least one of the above verbs.

In order to analyse the vast amount of data (cf. Table 35) provided by informants, the repertoire of nouns was divided into three main groups:
a) Group A, consisting of the five abstract nouns under study (i.e. conclusion, agreement, comparison, contribution and decision).
b) Group B, involving a list of seventeen nouns from the HSC (i.e. somebody's temperature, weight, a test, obesity, a tablet, research, action, damage, progress, attention, a suggestion, an effort, a photograph, changes, consensus, a mistake, significance) which had been found in combination with at least one of the verbs in the exercise.
c) Group C, consisting of fourteen general nouns (i.e. experience, a verdict, knowledge, a place, an exam, a guess, [financial] success, a profit, some writing, notes, a picture, skills and a goal) which, despite being typical collocates of the list of verbs provided, had not been found in combination with any of those verbs in the HSC corpus.

The results obtained from the first two groups, Groups A and B, will be compared against the HSC, whereas informants' verb-noun collocations with

[^85]the nouns from Group C will be compared against the BNC. Due to the fact that the nouns within this latter group were not typically distinctive of the medical discourse (and were not traced in the HSC in collocation with any of the verbs considered in this exercise either), it was necessary to use a general English corpus (i.e. the $B N C$ ) as a third comparison measure.

All these comparisons are aimed at investigating the informants' collocational preferences concerning abstract nouns and other general nouns characteristic of the scientific discourse on the one hand, and general English nouns, on the other. The examination of such preferences will provide information with reference to the participants' production and command of the suggested verbnoun collocations.

|  | (n) <br> MAKE | (\%) MAKE | (n) DRAW | $\begin{gathered} \hline \text { (\%) } \\ \text { DRAW } \end{gathered}$ | (n) <br> REACH | $\begin{gathered} \text { (\%) } \\ \text { REACH } \end{gathered}$ | $\begin{gathered} (\mathrm{n}) \\ \text { LEAD TO } \end{gathered}$ | $\begin{gathered} \text { (\%) } \\ \text { LEAD TO } \end{gathered}$ | $\begin{gathered} (n) \\ \text { TAKE } \end{gathered}$ | $\begin{gathered} (\%) \\ \text { TAKE } \end{gathered}$ | $\begin{aligned} & \hline(\mathrm{n}) \\ & \mathrm{DO} \end{aligned}$ | $\begin{aligned} & \hline \text { (\%) } \\ & \text { DO } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (financial) SUCCESS | 3 | 12.5 | 0 | 0.0 | 6 | 25.0 | 12 | 50.0 | 0 | 0.0 | 0 | 0.0 |
| A COMPARISON | 17 | 70.8 | 1 | 4.2 | 0 | 0.0 | 1 | 4.2 | 0 | 0.0 | 4 | 16.7 |
| A CONCLUSION | 1 | 4.2 | 10 | 41.7 | 10 | 41.7 | 4 | 16.7 | 0 | 0.0 | 0 | 0.0 |
| A CONTRIBUTION | 15 | 62.5 | 0 | 0.0 | 0 | 0.0 | 3 | 12.5 | 1 | 4.2 | 3 | 12.5 |
| A DECISION | 10 | 41.7 | 1 | 4.2 | 6 | 25.0 | 3 | 12.5 | 7 | 29.2 | 0 | 0.0 |
| A GOAL | 2 | 8.3 | 1 | 4.2 | 14 | 58.3 | 3 | 12.5 | 0 | 0.0 | 1 | 4.2 |
| A GUESS | 7 | 29.2 | 3 | 12.5 | 2 | 8.3 | 0 | 0.0 | 6 | 25.0 | 1 | 4.2 |
| A MISTAKE | 19 | 79.2 | 0 | 0.0 | 0 | 0.0 | 4 | 16.7 | 1 | 4.2 | 2 | 8.3 |
| A PHOTOGRAPH | 1 | 4.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 23 | 95.8 | 0 | 0.0 |
| A PICTURE | 3 | 12.5 | 10 | 41.7 | 0 | 0.0 | 0 | 0.0 | 10 | 41.7 | 0 | 0.0 |
| A PLACE | 0 | 0.0 | 0 | 0.0 | 12 | 50.0 | 2 | 8.3 | 10 | 41.7 | 0 | 0.0 |
| A PROFIT | 12 | 50.0 | 1 | 4.2 | 1 | 4.2 | 3 | 12.5 | 1 | 4.2 | 0 | 0.0 |
| A SPEECH | 11 | 45.8 | 1 | 4.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 9 | 37.5 |
| A SUGGESTION | 17 | 70.8 | 0 | 0.0 | 0 | 0.0 | 1 | 4.2 | 0 | 0.0 | 4 | 16.7 |
| A TABLET | 1 | 4.2 | 2 | 8.3 | 0 | 0.0 | 1 | 4.2 | 17 | 70.8 | 1 | 4.2 |
| A TEST | 6 | 25.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 5 | 20.8 | 14 | 58.3 |
| A VERDICT | 2 | 8.3 | 4 | 16.7 | 11 | 45.8 | 3 | 12.5 | 2 | 8.3 | 0 | 0.0 |
| ACTION | 1 | 4.2 | 0 | 0.0 | 0 | 0.0 | 4 | 16.7 | 12 | 50.0 | 3 | 12.5 |
| AN AGREEMENT | 2 | 8.3 | 0 | 0.0 | 19 | 79.2 | 3 | 12.5 | 0 | 0.0 | 0 | 0.0 |
| AN EFFORT | 18 | 75.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 5 | 20.8 |
| AN EXAM | 4 | 16.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 6 | 25.0 | 14 | 58.3 |
| ATTENTION | 2 | 8.3 | 6 | 25.0 | 0 | 0.0 | 0 | 0.0 | 7 | 29.2 | 2 | 8.3 |
| CHANGES | 13 | 54.2 | 1 | 4.2 | 0 | 0.0 | 6 | 25.0 | 0 | 0.0 | 5 | 20.8 |
| CONSENSUS | 0 | 0.0 | 0 | 0.0 | 17 | 70.8 | 7 | 29.2 | 0 | 0.0 | 0 | 0.0 |
| DAMAGE | 7 | 29.2 | 1 | 4.2 | 0 | 0.0 | 7 | 29.2 | 0 | 0.0 | 13 | 54.2 |
| EXPERIENCE | 2 | 8.3 | 2 | 8.3 | 9 | 37.5 | 5 | 20.8 | 4 | 16.7 | 0 | 0.0 |
| KNOWLEDGE | 0 | 0.0 | 1 | 4.2 | 7 | 29.2 | 10 | 41.7 | 4 | 16.7 | 0 | 0.0 |
| NOTES | 0 | 0.0 | 3 | 12.5 | 0 | 0.0 | 0 | 0.0 | 21 | 87.5 | 0 | 0.0 |
| OBESITY | 0 | 0.0 | 0 | 0.0 | 2 | 8.3 | 18 | 75.0 | 1 | 4.2 | 0 | 0.0 |
| PROGRESS | 10 | 41.7 | 0 | 0.0 | 1 | 4.2 | 7 | 29.2 | 0 | 0.0 | 7 | 29.2 |
| RESEARCH | 3 | 12.5 | 1 | 4.2 | 0 | 0.0 | 2 | 8.3 | 1 | 4.2 | 13 | 54.2 |
| SB'S TEMPERATURE | 0 | 0.0 | 1 | 4.2 | 3 | 12.5 | 0 | 0.0 | 13 | 54.2 | 0 | 0.0 |
| SIGNIFICANCE | 1 | 4.2 | 1 | 4.2 | 10 | 41.7 | 4 | 16.7 | 2 | 8.3 | 1 | 4.2 |
| SKILLS | 0 | 0.0 | 3 | 12.5 | 8 | 33.3 | 2 | 8.3 | 1 | 4.2 | 2 | 8.3 |
| SOME WRITING | 0 | 0.0 | 3 | 12.5 | 0 | 0.0 | 0 | 0.0 | 2 | 8.3 | 16 | 66.7 |
| WEIGHT | 0 | 0.0 | 1 | 4.2 | 7 | 29.2 | 3 | 12.5 | 7 | 29.2 | 0 | 0.0 |

Table 35 Restricted verb-noun collocations (Group A: abstract nouns; Group B: nouns characteristic of the medical discourse; Group C: general English nouns not found in the HSC)

## a) Group A: restricted verb + abstract noun collocations

Data from Exercise 4 evidence that informants seemed to be familiar with many of the restricted verb collocates of the abstract nouns examined in this research. As was the case in Exercise 2 (cf. section 5.1.1), participants in the study identified some appropriate verb-noun collocations that typically occur in scientific discourse (e.g. draw a conc/usion, reach a conc/usion, lead to a conclusion, reach an agreement, make a comparison, do a comparison). The following Table displays all the combinations of the type restricted verbabstract noun provided by informants:

|  | $(\mathrm{n})$ <br> MAKE | $(\%)$ <br> MAKE | $(\mathrm{n})$ <br> DRAW | $(\%)$ <br> DRAW | $(\mathrm{n})$ <br> REACH | $(\%)$ <br> REACH | $(\mathrm{n})$ <br> LEAD TO | $(\%)$ <br> LEAD TO | $(\mathrm{n})$ <br> TAKE | $(\%)$ <br> TAKE | $(\mathrm{n})$ <br> DO | $(\%)$ <br> DO |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A COMPARISON | 17 | 70.8 | 1 | 4.2 | 0 | 0.0 | 1 | 4.2 | 0 | 0.0 | 4 | 16.7 |
| A CONCLUSION | 1 | 4.2 | 10 | 41.7 | 10 | 41.7 | 4 | 16.7 | 0 | 0.0 | 0 | 0.0 |
| A CONTRIBUTION | 15 | 62.5 | 0 | 0.0 | 0 | 0.0 | 3 | 12.5 | 1 | 4.2 | 3 | 12.5 |
| A DECISION | 10 | 41.7 | 1 | 4.2 | 6 | 25.0 | 3 | 12.5 | 7 | 29.2 | 0 | 0.0 |
| AN AGREEMENT | 2 | 8.3 | 0 | 0.0 | 19 | 79.2 | 3 | 12.5 | 0 | 0.0 | 0 | 0.0 |

Table 36 Group A: restricted verb + abstract noun collocations
Figures in the above Table reveal that informants' verb-noun collocations regarding the nouns conclusion, agreement and comparison are very similar to the findings observed in the HSC corpus (cf. sections 4.3, 4.4 and 4.5). Restricted word combinations such as draw a conclusion, reach an agreement and make a comparison appeared to be the most frequent collocations both in the HSC and the informants' data.

| HSC | draw a conclusion <br> lead to a conclusion |  |  |
| :---: | :---: | :---: | :---: |
| reach a conclusion |  |  |  |
| reach an agreement <br> lead to an agreement <br> make an agreement |  |  |  |
| make a comparison |  |  |  |
| draw a comparison | do a comparison |  |  |
| do a comparison | draw a comparison |  |  |

Table 37 Most frequent collocates of verb + conclusion, verb + agreement and verb comparison in the HSC and the informants' data

However, several misuses of delexicalised verbs in combination with the nouns contribution and decision were also found in the data. Despite the fact that $62,5 \%$ of informants produced the delexical combination make + contribution, which was also the most common collocation of the type "support verb" + contribution in the HSC, there was also a $16,7 \%$ of participants who produced some other deviant collocations such as lead to a contribution (12,5\%) and take a contribution (4,2\%). Similarly, the abstract noun decision was associated with the most frequent delexicalised verbs (i.e. make, take and reach) in scientific discourse, but it was also used in combination with deviant verbs: lead to a decision (12,5\%) and draw a decision (4,2\%).

Thus, it can be stated that in line with the findings observed in Exercise 2, informants did not appear to have many problems with restricted verb collocates except for the production of some deviated verb-noun collocations with the nouns contribution and decision, in which clear cases of direct confusion between two delexical verbs (e.g. make vs. do a contribution, make vs. lead to a decision, make vs. draw a decision) were traced. These deviant collocations and some others that will be discussed in Groups B and C certify informants' uncertainty over appropriate collocability.

## b) Group B: restricted verb + nouns characteristic of the medical discourse

As noted earlier, a total of seventeen nouns that had proven to be representative of medical discourse were included in Exercise 4. It was expected that informants would have very few difficulties in associating these nouns with appropriate verbs since they were common expressions in the medical literature they were used to reading. However, the analysis of their collocations, as will be seen, questions that initial expectation. See Table 38 below:

|  | $(\mathrm{n})$ <br> MAKE | $(\%)$ <br> MAKE | $(\mathrm{n})$ <br> DRAW | $(\%)$ <br> DRAW | $(\mathrm{n})$ <br> REACH | $(\%)$ <br> REACH <br> (n) | $(\mathrm{n})$ <br> LEAD <br> TO | $(\%)$ <br> LEAD <br> TO | $(\mathrm{n})$ <br> TAKE | $(\%)$ <br> TAKE | $(\mathrm{n})$ <br> DO | $(\%)$ <br> DO |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A MISTAKE | 19 | 79.2 | 0 | 0.0 | 0 | 0.0 | 4 | 16.7 | 1 | 4.2 | 2 | 8.3 |
| A PHOTOGRAPH | 1 | 4.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 23 | 95.8 | 0 | 0.0 |
| A SUGGESTION | 17 | 70.8 | 0 | 0.0 | 0 | 0.0 | 1 | 4.2 | 0 | 0.0 | 4 | 16.7 |
| A TABLET | 1 | 4.2 | 2 | 8.3 | 0 | 0.0 | 1 | 4.2 | 17 | 70.8 | 1 | 4.2 |
| A TEST | 6 | 25.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 5 | 20.8 | 14 | 58.3 |
| ACTION | 1 | 4.2 | 0 | 0.0 | 0 | 0.0 | 4 | 16.7 | 12 | 50.0 | 3 | 12.5 |
| AN EFFORT | 18 | 75.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 5 | 20.8 |
| ATTENTION | 2 | 8.3 | 6 | 25.0 | 0 | 0.0 | 0 | 0.0 | 7 | 29.2 | 2 | 8.3 |
| CHANGES | 13 | 54.2 | 1 | 4.2 | 0 | 0.0 | 6 | 25.0 | 0 | 0.0 | 5 | 20.8 |
| CONSENSUS | 0 | 0.0 | 0 | 0.0 | 17 | 70.8 | 7 | 29.2 | 0 | 0.0 | 0 | 0.0 |
| DAMAGE | 7 | 29.2 | 1 | 4.2 | 0 | 0.0 | 7 | 29.2 | 0 | 0.0 | 13 | 54.2 |
| OBESITY | 0 | 0.0 | 0 | 0.0 | 2 | 8.3 | 18 | 75.0 | 1 | 4.2 | 0 | 0.0 |
| PROGRESS | 10 | 41.7 | 0 | 0.0 | 1 | 4.2 | 7 | 29.2 | 0 | 0.0 | 7 | 29.2 |
| RESEARCH | 3 | 12.5 | 1 | 4.2 | 0 | 0.0 | 2 | 8.3 | 1 | 4.2 | 13 | 54.2 |
| SOmebody's | 0 | 0.0 | 1 | 4.2 | 3 | 12.5 | 0 | 0.0 | 13 | 54.2 | 0 | 0.0 |
| TEMPERATURE |  |  |  |  |  |  |  |  |  |  |  |  |
| SIGNIFICANCE | 1 | 4.2 | 1 | 4.2 | 10 | 41.7 | 4 | 16.7 | 2 | 8.3 | 1 | 4.2 |
| WEIGHT | 0 | 0.0 | 1 | 4.2 | 7 | 29.2 | 3 | 12.5 | 7 | 29.2 | 0 | 0.0 |

Table 38 Group B: restricted verb + noun characteristic of the medical discourse
The informants' data contain 62 different collocations within Group B as opposed to 23 verb-noun collocations found in the HSC. The comparison with the HSC provides the following data:

| HSC | Informants' data |
| :---: | :---: |
| take temperature |  |
|  | reach temperature |
|  | draw temperature |
|  | reach weight |
| take weight |  |
|  | lead to weight |
|  | draw weight |
| do a test |  |
| make a test |  |
| take a test |  |
| lead to obesity |  |
|  | reach obesity |
|  | take obesity |



| make changes |  |
| :---: | :---: |
| lead to changes |  |
|  | do changes |
|  | draw changes |
| reach consensus |  |
| lead to consensus |  |
| make a mistake |  |
| lead to a mistake |  |
|  | do a mistake |
| - | take a mistake |
| reach significance |  |
|  | lead to significance |
|  | take significance |
|  | draw significance |
|  | make significance |

Table 39 Most frequent collocates of verb + noun characteristic of the medical discourse in the HSC and the informants' data.

The most striking feature in Table 39 is that informants provided a wide range of combinations in comparison with the HSC results. Percentages seem to indicate that more than a half of those inquired may be familiar with some verb-noun collocations such as take somebody's temperature (54,2\%), do a test $(58,3 \%)$, lead to obesity ( $75 \%$ ), take a tablet $(70,8 \%)$, do research (54,2\%), do damage (54,2\%), make a suggestion (70,8\%), make an effort ( $75 \%$ ), take a photograph ( $95,8 \%$ ), reach consensus ( $70,8 \%$ ), make a mistake $(79,2 \%)$ but at the same time they appeared to have problems with other restricted verbs, as the wide list of support verbs being used seems to prove.

With the only exception of the nouns consensus (e.g. reach consensus, lead to consensus) and test (e.g. do a test, make a test and take a test), the informants' use of the other fifteen nouns in Group B gave rise to deviant collocations like: lead to weight (12,5\%), reach obesity ( $8,3 \%$ ), make research (12,5\%), lead to action (16,7\%), make damage (29,2\%), do progress (29,2\%), take attention (29,2\%), do a suggestion (16,7\%), do changes
(20,8\%), and lead to significance (16,7\%). Such a long list exemplifies that verb deviance often occurred within this group. Although informants may be aware of the frequent occurrence of the six verbs provided in this exercise due to the fact that they are used to reading scientific articles in English, it is clear from the above deviant word-combinations that collocations of verbs with delexical senses cause some combinatorial problems to the analysed community.

As can be inferred from the informants' collocations in Table 39, an area that emerges as being particularly difficult for participants is the distinction between similar pairs of verbs. Clear cases of direct confusion between two delexical verbs can be seen in examples such as the following:
(131) take weight (54,2\%) vs. *reach weight (12,5\%)
(132) do research (54,2\%) vs. *make research (12,5\%)
(133) do damage (54,2\%) vs. *make damage (29,2\%)
(134) make progress (41,7\%) vs. *do progress (29,2\%)
(135) make a suggestion (70,8\%) vs. *do a suggestion (16,7\%)
(136) make an effort (75\%) vs. *do an effort (20,8\%)
(137) make changes ( $54,2 \%$ ) vs. *do changes $(20,8 \%)$
(138) make a mistake ( $79,2 \%$ ) vs. *do a mistake ( $8,3 \%$ )
(139) reach significance (41,7\%) vs. *take significance (8,3\%)

In light of the above instances, the use of do and make appears as a noticeable problem in the present data. Although a minimum of 10 informants ( $41,7 \%$ ) produced appropriate restricted verb collocates for the nouns progress, suggestion, effort, changes and mistake, the production of do and make was also confused by a $19,64 \%$ of participants.

Unlike other studies (Burgschmidt \& Perkins 1985, Kaszubski 2000, Nesselhauf 2005), the present analysis seems to confirm that make and do are particularly liable to confusion. Nesselhauf (2005:77) argues that such a confusion "while frequent in the beginning and intermediate stages of learning, decreases in the language of more advanced learners". Evidence
from this study, on the contrary, appears to indicate that the distinction between these two highly-frequent verbs remains a difficult area among informants, who had devoted between 3,5 and more than 30 years to the learning of English. (cf. section 3.4).

As already stated, the verb do can be regarded as the most problematic support verb for informants, in the sense that it is often produced when make would be more suitable. Out of the 39 confusions of light verbs in examples (131-139) above, do was produced inappropriately 23 times (vs. 10 inappropriate uses of make, 3 of reach and 2 of take), while the appropriate verb would have been make. Other deviant collocations involving verbs in delexical senses in combination with general English words were found in informants' responses to Exercise 4, and will be now discussed in the analysis of the nouns in Group C.

## c) Group C: restricted verb + general English nouns

The third group of nouns included in Exercise 4 consists of fourteen randomly selected general English nouns (i.e. experience, a verdict, knowledge, a place, an exam, a guess, a speech, [financial] success, a profit, some writing, notes, a picture, skills and a goal), which were not characteristic of the medical discourse analysed in this research. This type of general nouns was included so as to find out whether informants would also have difficulties in associating them with restricted verb collocates or not. Table 40 below displays all the word combinations supplied by participants.


Table 40 Group C: restricted verb + general English nouns

Given the fact that informants had claimed that they were used to reading scientific papers in English on a regular basis (cf. section 3.4), it could be expected that the number of deviations concerning the verb in Groups A and B would be smaller than the ones in Group C. However, data show that this is not quite the case. Looking carefully at the individual verb-noun collocations produced by informants and comparing them against the actual word combinations traced in the $B N C^{121}$ (cf. Table 41), 10 verbs were produced inappropriately by more than two informants (i.e. reach experience, take experience, draw a verdict, lead to a verdict, take knowledge, draw a guess, lead to profit, draw some writing, draw notes, draw skills).

[^86]| HSC | Informants' data |
| :---: | :---: |
|  | reach experience |
| lead to experience |  |
|  | take experience |
|  | draw experience |
|  | make experience |
| reach a verdict |  |
|  | draw a verdict |
|  | lead to a verdict |
|  | make a verdict |
|  | take a verdict |
| lead to knowledge |  |
| reach knowledge |  |
|  | take knowledge |
|  | draw knowledge |
| take a place |  |
| reach a place |  |
|  | lead to a place |
| do an exam |  |
| take an exam |  |
| make an exam |  |
| make a guess |  |
| take a guess |  |
|  | draw a guess |
|  | reach a guess |
|  | do a guess |
| make a speech |  |
| do a speech |  |
|  | draw a speech |
| lead to (financial success) |  |
| reach (financial success) |  |
| make (financial success) |  |


| make a profit |  |
| :---: | :---: |
|  | lead to a profit |
|  | reach a profit |
|  | take a profit |
|  | draw a profit |
| do some writing |  |
|  | draw some writing |
|  | take some writing |
| take notes |  |
| make notes |  |
|  | draw notes |
| make a picture |  |
| do a picture |  |
| draw a picture |  |
| take a picture |  |
| reach skills |  |
|  | draw skills |
|  | lead to skills |
|  | do skills |
|  | take skills |
| make a goal |  |
| reach a goal |  |
| lead to a goal |  |
|  | draw a goal |
|  | do a goal |

Table 41 Most frequent collocates of verb + general English nouns in the HSC and the informants' data.

Similarly to what was observed in the verb-noun collocations of Group B, the number of deviations within this group is remarkably high. With the only exception of the nouns picture and exam, which were both found in appropriate collocations (e.g. draw/ take/ make a picture and do/ take/ make an exam), the other twelve were associated with at least one support verb which had not been found in the $B N C$.

According to the deviations displayed in Table 41, the nouns skills, experience and verdict stand out as the most problematic ones: four different inappropriate delexical verbs were associated with each of them (i.e. draw skills [12,5\%], lead to skills [8,3\%], do skills [8,3\%], take skills [4,2\%]; reach experience [37,5\%], take experience [16,7\%], draw experience [8,3\%], make experience [8,3\%], draw a verdict [16,7\%], lead to a verdict [12,5\%], make a verdict $[8,3]$, take a verdict [8,3]). Such a wide range of verbs in collocations where only one verb from the six provided appeared to be appropriate in the BNC corpus (i.e. lead to experience, reach skills and reach a verdict) reinforces the idea that verbs in verb-noun collocations pose great difficulty to non-native speakers.

Another case worth mentioning as being particularly susceptible to deviation in the study is the verb draw. But for draw a picture, no other instance of draw was found in the BNC in combination with the other thirteen nouns analysed in this group. Interestingly, however, draw was produced by at least two informants in six deviant collocations, namely, draw experience, draw a verdict, draw a guess, draw some writing, draw notes and draw skills. As Table 41 above shows, a total of 22 occurrences of deviant collocations of the type "draw + noun" were provided. In all these cases draw was used inappropriately instead of lead to, in instances like draw experience or draw knowledge; reach (e.g. draw a verdict, draw skills, draw a goal); make (e.g. draw a guess, draw a speech, draw a profit, draw notes) or do (e.g. draw some writing).

A possible explanation for this consistent misuse of the verb draw is that informants might have found it difficult to distinguish between its literal sense (i.e. draw a picture) and its more figurative sense of "to obtain something from something else/somebody" (e.g. draw a conclusion) and, as a consequence, they produced the above unconventional collocations in which draw was used in a non-literal sense with a questionable noun (e.g. draw a verdict, draw a goal, draw a profit), giving rise to inappropriate word combinations.

Altogether, the six verbs analysed in Exercise 4 (i.e. make, draw, reach, lead to, take and do) were susceptible to deviation. Taking the thirty-six nouns into account, however, it is noticeable that draw and lead to stand out as the most problematic for informants. While draw was inappropriately produced in 18 different deviant constructions, lead to was inappropriately produced in 15 collocations. Do was combined with 13 inappropriate nouns, take with 12 and make and reach appeared in combination with 8 and 7, respectively, deviant nouns.

Regarding the distribution of the described verb-noun deviations across the three groups established in the exercise, that is, a) abstract nouns characteristic of medical discourse (Group A), b) general nouns often used in medical articles (Group B) and c) general English nouns (Group C), several points should be underlined. In general terms, the six verbs were particularly deviant with medical specific nouns and general nouns ${ }^{122}$. On the contrary, deviations of the type "verb + abstract noun" were less prevalent; probably due to the fact that on the one hand, the repertoire of abstract nouns was smaller (5) than the list of nouns in Groups B and C (17 and 14, respectively), and on the other, the abstract nouns examined had proven to co-occur with many of the verbs provided.

As Figure 68 (cf. Appendix 7) shows, inappropriate uses of draw were particularly frequent with general nouns (Group C) and nouns characteristic of the scientific discourse (Group B), i.e. draw a verdict, draw a guess, draw temperature. Deviant uses of lead to (cf. Figure 70), make (cf. Figure 67) and do (cf. Figure 72) were especially noticeable in combination with nouns from Group B (e.g. lead to a tablet, lead to damages, lead to significance, do a tablet, do an effort, do a mistake), whereas reach and take were produced inappropriately in combination with both general English nouns and nouns frequently found in the HSC (cf. Figures 69 and 71).

[^87]Altogether, it can be concluded that all the above verb deviations indicate the general difficulty of support verbs in restricted verb-noun collocations for nonnative speakers (Howarth 1996/1998; Kaszubski 2000; Altenberg \& Granger 2001; Nesselhauf 2005) and underline the fact that informants were not fully aware of the restrictions concerning the collocability of either scientificallyrelated (Groups A and B) or general nouns (Group C). A summary of the major results obtained from the informants' data analysis investigated in this chapter will be presented in the following section.

### 5.2 Summing up of findings

Since the intention of this chapter was to make a valid comparison between native speakers' performance and informants' collocational competence with reference to the selected five abstract nouns, all the observations made in the non-native speakers' data were checked against the HSC and the BNC. It was hoped that the examination of the informants' written production would reveal similarities as well as significant differences from native speakers' texts. As shown in the previous sections, although similarities could be traced in some collocational patterns successfully identified by participants (i.e. appropriate restricted verb-noun collocations and adjective + noun patterns), the collocational patterning of abstract nouns was found to be susceptible to deviation particularly often.

Major results of the analyses conducted in section 5.1 indicate that most deviations traced in the informants' production refer to the three most problematic areas which were also identified by participants in the Survey Content-Based Questions (cf. section 5.3). As will be seen in the last section of this chapter, when asked about the main difficulties they encountered while writing a paper in English, most of them pointed out three chief aspects; namely, a) the use of general words and expressions characteristic of the medical genre, b) the distinction between similar pairs of words and c) the correct application of grammatical rules when constructing sentences.

From the evidence of non-native speakers' collocational deviations, it is reasonable to suggest that they lack control of the phraseological behaviour of
nouns in medical English. Deviations were found both in restricted verb-noun collocations as well as in free verb combinations. Whereas results show that they were able to produce appropriate restricted verb collocates in Exercises 2 (cf. section 5.1.1) and 4 (cf. section 5.1.4), such as reach an agreement, make a comparison, draw a conclusion, the fact that in Exercise 2 they also made use of a wide range of free verb collocates where a restricted verb would have been more suitable (e.g. *achieve an agreement, give/adopt/publish/report a conclusion, *perform a comparison) and that they failed to identify the appropriate delexicalised verbs in combination with the nouns contribution and decision in Exercise 4 (e.g. *lead to a contribution, *draw a decision) reveals that the distinction between both types of word combinations poses some problems for informants. This finding goes in line with Gouverneur's (2008) observation that delexicalised uses of these verbs "represent a stumbling block to native-like proficiency." (Gouverneur 2008:223).

In addition, it was also observed that informants found it difficult to distinguish between similar pairs of verbs such as do vs. make, reach vs. achieve and take vs. reach. This deviation in the verb was especially noticeable in combination with abstract nouns (cf. section 5.1.4a) and nouns characteristic of medical English (cf. section 5.1.4c). Such a finding was unexpected since informants were supposed to be aware of the collocational patterning of medical every-day expressions like take weight, do research, reach significance and do damage. Part of the reason for this collocation difficulty might be that these support verbs can be used in combination with a wide range of nouns and may have similar translations into Spanish (i.e. do vs. *make research ["hacer, realizar una investigación"], take vs. *reach somebody's temperature ["tomarle la temperatura a alguien", "alcanzar una temperatura"], take vs. *reach weight ["alcanzar/ganarlcoger peso"], reach vs. *achieve an agreement ["alcanzar un acuerdo"]. This semantic similarity therefore leads to confusion particularly often.

As to which of the six verbs in Exercise 4 (i.e. make, draw, reach, lead to, take and do) were more liable to deviation when combining with the list of nouns
provided, it must be noted that deviations were found in all of them. However, the verbs draw and lead to clearly stand out as the most problematic ones, giving rise to inappropriate collocations such as *draw a decision, *draw a tablet, *lead to a contribution, *lead to damage, *lead to a decision. Clear evidence is found here to support Howarth's opinion that "they [learners] are perhaps not aware that figurative senses are more restricted in collocability than are literal senses and therefore require greater precision in their use" (Howarth 1996:160). Thus, a possible explanation for the overuse of those two delexical verbs may lie in the fact that informants might have not been aware of the distinctive collocational patterns associated with the literal and the more figurative senses of both verbs.

Two further aspects that were investigated with regard to participants' command of the phraseological behaviour of abstract nouns in medical English were their knowledge of the collocational restrictions involved in fixed expressions like "there + be + (adjective) agreement" and in conclusion as well as the most common adjective collocates of the abstract nouns under study.

On the one hand, the failure to produce appropriate lexical bundles with the nouns agreement and conclusion emerged as a recurrent deviation in Exercises 2 and 3 . The case of "there + be + (adjective) agreement" was often liable to confusion. A total of 19 informants were unable to produce the expression "there was (unanimous) agreement" appropriately and the deviant structures they provided, such as "an agreement was done" and "it was produced an agreement", clearly show a great deal of transfer from their mother tongue (i.e. "se produjo un acuerdo"). This strong influence from informants' L1 can be seen to be related with their writing process, as described in section 5.3. The fact that 20,8\% of informants claimed that they first wrote a draft of a medical paper in Spanish and then translated it into English became evident in Exercise 3, where transfer from their L1 was most noticeable.

On the other hand, other individual collocations that were found to pose particular problems correspond to the adjectives selected as premodifiers of the abstract nouns examined. As a further indication of informants' lack of collocational competence concerning the use of abstract nouns, it should be underlined that some of the adjective-noun expressions provided consisted of questionable word combinations like ?reliable agreement, ?reliable contribution, ?late agreement and ?late comparison, which had not been traced in the native corpora.

Likewise, the use of semantically similar adjectives (i.e. little, short and small) was particularly difficult among participants. Examples such as *short agreement, *short comparison and *short contribution, where the use of the adjective little would have been expected, give account of the fact that the semantic similarity between both adjectives as well as their similar translation equivalents into Spanish (i.e. poco, escaso, pequeño) may have contributed to the informants' misuse of these adjective collocates.

Another area which was also affected by informants' L1 interference was, unexpectedly, morphology. Morphological deviations in the word form of the nouns comparison (i.e. *comparation, *comparition, *comparision) as well as the adjective biological (i.e. *biologyc) are clear examples of informants' tendency to transfer morphological forms from their L1. Similarly, participants' attested preference for periphrastic structures like "?responsible for the making of decisions" over compound lexemes such as decision making serves to reinforce the assertion that non-native speakers show a strong inclination to literal translations.

A final issue worth mentioning refers to informants' uncertainty over the most common grammatical constructions typical of the word combinations examined in this study. As mentioned earlier, participants had already highlighted the use of appropriate grammatical rules as a problem area when writing their articles in English (cf. section 5.3). Deviations regarding the use of passive forms instead of the active voice (and vice versa), syntactic structures to express impersonality (e.g. "*it was produced an agreement",
"before *they obtain valid conclusions", "*it is general agreement that") as well as the use of the appropriate non-finite forms following a preposition (e.g. "before *to obtain/ before *reach + (adjective) conclusion") also occurred in the informants' data.

All the above findings seem to indicate that the phraseological patterning of abstract nouns in medical English poses some problems for the discourse community under investigation. Although in Nesselhauf's view (2005:246) some other factors such as each informant's language aptitude and exposure to English, their motivation, their writing techniques and beliefs, among others, should also be taken into account when analysing non-native speakers' collocational performance, the present results, yet far from exhaustive, highlight informants' lack of knowledge over proper collocability and stress the need to provide them with useful resources and tools aimed specifically at improving their collocational competence.

Having investigated the informants' collocational performance in the worksheet of exercises, in the following section an attempt is made to briefly outline informants' views of their writing process in English so as to find out what linguistic areas are highlighted as the most problematic ones.

### 5.3 Informants' self-assessment (Survey Content-Based

 Questions)As noted in chapter 3, the survey conducted among participants consisted of two clearly differentiated sorts of questions: a) the Survey Profile Questions already discussed in the characterisation of informants (cf. section 3.4) and b) the Survey Content-Based Questions which were more closely related to the participants' perception regarding their writing process in English, on the one hand, and the resources they highlighted as useful tools to help them improve their production of scientific papers in English, on the other.

Apart from assessing their linguistic competence when dealing with the collocational patterns selected for this study, it also seemed advisable to find out the steps they used to take when writing in English. Although informants'
own views and perceptions of their written production were not the main aim of the present research, it appeared to be worth investigating how informants described their writing process as well as the areas they regarded as particularly difficult when producing their medical papers in English. Participants were also inquired about the resources they would like to have at their disposal so as to overcome those problem areas and facilitate their writing. In this section the results obtained from the informants' self-evaluative view of their linguistic skills and needs (i.e. Survey Content-Based Questions 7-9) are presented.

When being asked about the steps taken when planning and writing a scientific article in English (cf. Survey Content-Based Question 7), eight doctors ( $33,4 \%$ ) pointed out that they first made a draft in English and, afterwards, they looked up unknown words or expressions in dictionaries and thesauruses, whereas some others (20,8\%) wrote a first version in their mother tongue and then they themselves translated that into English. A very low percentage ( $12,5 \%$ ), consisting of three informants, just resorted to asking for some expert advice before handing in their papers. Only one informant (PH6) stated that she used to write the text directly in English without making any further reference to her writing process.

Due to the fact that this was a closed-ended multiple-choice question ${ }^{123}$, some participants chose more than one option so as to describe their writing process more thoroughly. As Figure 65 illustrates, two doctors (PH3, PH10) claimed that they first wrote their papers in Spanish, then translated them into English and, finally, asked for advice so as to polish their texts before sending them for publication. Informants HN3 and PH2 followed a similar writing process as both of them stated that they wrote a first version of their texts in their mother tongue and translated that version into English. Afterwards, they tried to improve the English draft by making use of dictionaries. Informant PH2 included a final step by asking for expert advice before sending in his article to be considered for publication.

[^88]Finally, it should be mentioned that one informant (ALB3), who commented that she first made a draft of her papers in English, underlined the importance of consulting already published articles in search of useful expressions she could borrow for her own written productions. This assertion, however, should be taken cautiously as being familiar with certain useful recurrent expressions does not necessarily entail knowing how to use them correctly.


Survey Question 7: When writing a paper in English, what is your writing process?
a.first you write your contribution in your mother tongue and then translate it into English
b.you make a draft in English and then look up unknown words or expressions
c. you ask for some expert advice before handing in your paper
d. Other: (please specify) $\qquad$

Figure 65 Informants' writing process
Informants were further inquired about the main linguistic areas they found more difficult when writing up their research papers in English ${ }^{124}$. In this question, in the form of a semantic differential scale, respondents were asked to indicate their answer by marking a continuum between the adjectives "easy" and "difficult" at the extremes. They were told to assign a number to a

[^89]list of five aspects in order of difficulty (1-very easy; 2-easy; 3-not so easy; 4difficult and 5-extremely difficult).

They were given the following aspects to consider: a) specific (medical) terminology in English, b) general words and expressions most commonly used in medical publications, c) distinction between similar pairs of words (e.g. do vs. make), d) distribution of paragraphs and e) grammatical rules when constructing sentences. There was also a sixth aspect, labelled as "Others (Please specify)", where participants were given the chance to mention some other difficulties, not included in the survey, they may encounter when writing in English ${ }^{125}$.

Dealing with specific medical terminology was not regarded as difficult. In fact, most informants found it either "very easy" (41,7\%) or "easy" (45,8\%). On the contrary, the survey revealed that the use of general items and recurrent expressions typical of their specific medical community entailed more complexity for more than the half of the sample ( $58,3 \%$ ).

Another area to be examined in detail was informants' command of similar pairs of words in terms of when (context) and how to use each of them. Most participants labelled that aspect as either a "not so easy" (41,7\%) or "difficult" (45,8\%) task.

The fourth aspect to be analysed was the informants' view of the distribution of paragraphs when editing and redrafting their texts. 54,2\% of those interviewed considered it as a "not so easy" task, whilst a $29,2 \%$ thought it was "easy". Thus, it seems that the organisation of a text, on the whole, was not perceived as an extremely difficult aspect of writing.

The last feature mentioned in question 8 referred to the application of grammatical rules when constructing sentences. As was the case with participants' difficulty in discriminating similar pairs of words, nearly half of the

[^90]sample considered that grammar was a problem area in the whole process of writing. It is also worth mentioning at this stage that unlike other aspects, the correct use of grammatical rules was labelled as "extremely difficult" by 12,5\% of those interviewed. No higher percentage of the "extremely difficult" category could be traced in any of the previously described aspects.

As already stated, informants were allowed to provide other aspects relevant to the writing process itself. Only four participants added their own ideas, which could be paraphrased as follows:
a) Introducing subordinate sentences (ALB3)
b) Using linking words to connect sentences (PH5)
c) Dealing with phrasal verbs and prepositions (ALB2, PH12)
d) Being able not to write in a Spanish-like way (ALB2)

All the above features were considered to be problem areas and, therefore, were labelled as "extremely difficult".

Finally, informants were encouraged to think of any tool and/or resource they found to be useful in order to sort out the problems and difficulties they encountered when writing their medical papers in English (cf. Survey ContentBased Question 9). They were provided with some examples, such as a lexical database of general words and common expressions in academic writing and (specialised) dictionaries. A total of fourteen informants highlighted the importance of the abovementioned tools:
"I usually look for help in the on-line 'Cambridge Dictionary for Advanced Learners', where I can find really helpful examples." (PH5)
"A lexical database of words and common expressions is a good idea."(HN3)
"I think specialized dictionaries would be very useful."(HN7)
"I use a specialized dictionary." (HN8)

However, twelve doctors suggested some other tools that should be taken into consideration as well. All in all, their suggestions fall into three main categories: technical devices and on-line resources, human resources and the learner's attitude. The following Table shows their suggestions along with some of their quotations so as to illustrate their points:

| Technical devices \& on-line resources: | $\checkmark$ Automatic on-line translators, collocation dictionaries (3 informants) <br> "l'd like an automatic on-line translator, but there are no good ones available."(ALB1) |
| :---: | :---: |
|  | $\checkmark$ wordreference.com (1 informant) |
| Human resources: | $\checkmark$ Training courses on writing techniques (2 informants) <br> "In general I use medical dictionaries in English, but some courses on style in medical English will help me a lot." (PH12) |
|  | $\checkmark$ Building up lexical databases of frequent errors (1 informant) <br> "A lexical database of the most frequent mistakes non-native speakers make when writing in English will help me to avoid them." (ALB3) |
|  | $\checkmark$ Linguists available to give support on writing (3 informants) <br> "I think it must be useful that a linguistic working in any University Department could help us not only to write but to resolve the most frequent questions." (PH4) |
| Learner's attitude: | $\checkmark$ Reading more often in English (1 informant) <br> "I try to learn paying attention when I read English journals."(ALB2) |
|  | $\checkmark$ Writing more often in English (1 informant) "My writing will improve if I wrote more often in English." (PH3) |

Table 42 Suggested tools and resources
As noted earlier, despite not being the main aim of the present investigation, informants' perceptions of their writing process in English serve to complement their characterisation. In light of their responses, participants in the sample (i.e. doctors from different Spanish hospitals who were working on different research areas; cf. section 3.4) seemed to face similar problems when writing, editing and rewriting a scientific text in English.

As already discussed in the description of the informants' profile and, particularly, in the data obtained in Survey Profile Question 6 (cf. section 3.4), respondents seemed reluctant to consider themselves as regular writers of scientific papers in English because the production of an article as a whole
was seen as a team work in which each participant played a well-defined role: housemen were in charge of the field and laboratory work, whereas assistant doctors took decisions regarding which topic would be discussed in the research article and co-ordinated the whole process. With regard to the actual writing up of the article, they stated that the first draft was usually done in Spanish and then translated into English.

The above line of reasoning should not be overlooked when it comes to the descriptions informants made of the writing process they followed when producing an English article. Bearing in mind that writing the first draft in Spanish is usually the starting point (cf. section 3.4), it came as no surprise that a $20,8 \%$ of the informants claimed that they first wrote down their ideas in their mother tongue and then translated them into English. The obvious implications (i.e. literal translations, the confusion in the use of similar pairs of words, collocational problems) of such a methodological approach to the writing of an article in a foreign language were further discussed in the analyses of the worksheet of exercises (cf. section 5.1).

A noticeably high $33,4 \%$ claimed, though, that they wrote their first draft in English and then made use of dictionaries and thesauruses so as to improve their writing. They seemed to realise that it is doubtless essential to master the structures and the phraseology that resemble typical and consistent expressions in scientific English. Some other participants underlined the fact that their writing process was a combination of several of the options provided in question 7; that is, writing in Spanish and translating that text into English, re-writing the English draft and asking for some expert advice to sort out some editing problems and clarifying some doubts. Whatever their choice, they have acknowledged the relevance of the writing process in producing a good quality piece of writing.

It is also worth mentioning another strategy pointed out by informant ALB3. She stated the importance of reading already published articles since they were "a very valuable source of good examples of recurrent expressions".

Once more, informants seemed to perceive a symbiotic relationship between reading and writing.

Some of the most interesting pieces of information revealed by the survey are concerned with the areas non-native speakers of English highlighted as the most difficult when being faced with a white page or even with a Spanish text to be translated into English (cf. Survey Content-Based Question 8). One of the research questions in this study (cf. chapter 1) attempted to find out whether health scientists would have, as expected, more difficulties in dealing with general words than with specific terms as they were used to the specific terminology in medical English. In fact, in some cases they use English items rather than their Spanish equivalents to refer to some processes, illnesses and scientific mechanisms (i.e. HIV vs. VIH ${ }^{126}$; DNA vs. $A D N^{127}$; MHC vs. $C M H^{128}$, among others). Although Tognini-Bonelli (2001) points out that the identification of specific terminology is extremely important in Language for Specific Purposes (LSP), it was expected that this sample of Spanish doctors, who were used to reading and writing their articles in English, would already be familiar with the specific terms characteristic of their own field of work.

Data drawn from the survey (Cf. Survey Content-Based Question 8) are fully congruous with that initial expectation since $58,3 \%$ of informants found dealing with general words either "not so easy" (45,8\%) or "difficult" (12,5\%). In line with this problem area, the distinction between similar pairs of words was also regarded as a central difficult aspect. A third somewhat problematic area highlighted in the survey was the use of accurate grammatical rules when writing in English.

Surprisingly, the distribution of paragraphs when building up the layout of a text was not seen as a main problem. The fact that texts tended to be exhaustively revised by correctors, translators or some other English experts seems to make researchers be less worried about linking devices between

[^91]paragraphs than about the well-known phrasal verbs and prepositions, for instance. Yet it must be underlined that two of the four participants who contributed to the list of problem areas with their own aspects referred, essentially, to paragraph distribution as they claimed they had problems when introducing subordinate clauses as well as using cohesive devices to connect sentences within paragraphs. Last but not least, one informant stressed her constant fear of "thinking in Spanish" when writing in English. She pointed out that she found it very hard not to translate literally from her mother tongue.

All these lexico-grammatical and stylistic worries expressed by participants raise the issue of the importance of lexical collocations in vocabulary learning and, by extension, in written production. These findings suggest that participants do not necessarily find discipline specific medical vocabulary particularly difficult. Rather, it is the selection and use of the general nontechnical items along with their combinatorial potential what stands out, according to $58,3 \%$ of those interviewed, as one of the most difficult aspects of excelling in scientific writing.

Furthermore, when being inquired about what kind of tools and resources could help them improve the quality of their writing in English, more than half of the informants $(58,3 \%)$ remarked the usefulness of checking a lexical database consisting of the most general items and expressions in medical English as well as writing with a specialised dictionary nearby.

Other worth notable suggestions put forward by informants pointed to the convenience of building up a lexical database of common errors typically made by non-native speakers. Some informants mentioned that there was a recurrent list of errors they constantly made which they found difficult to get rid of. Thus, they suggested they would benefit from checking errors made by their peers so as to avoid them.

Once again the need of training courses ${ }^{129}$ on writing techniques emerged in the survey as a key factor in the informants' own progress on writing skills. A further piece of evidence in favour of the importance they granted to training is that it was also recommended the utility of getting linguistic assistance in their workplace on a regular basis.

Finally, two informants' perceptions drew the attention to the language learner attitude when writing. Fully aware of their leading role in their own writing process, they felt there was a cause and effect relationship in both reading and writing:
$>$ the more attention one pays to what they read, the more significant learning will take place:
"I try to learn paying attention when I read English journals."(ALB2)
$>$ the more often one writes, the more their writing will improve:
"My writing will improve if I wrote more often in English." (PH3)

The Survey Content-Based Questions have highlighted some of the informants' writing needs when producing their medical papers. The results obtained have brought to light not only informants' perception of their writing process but also their weaknesses as far as writing skills is concerned. In addition, several suggestions on possible effective tools which could have a positive effect on their written English have also been made. Such needs point to three areas in particular in the field of foreign language acquisition: the need for lexical devices, such as lexical databases, collocation dictionaries and automatic translators; training courses on writing skills, and an increase of exposure, on behalf of the learner, to reading and writing in English.

[^92]
## CHAPTER 6: CONCLUSIONS, IMPLICATIONS AND FURTHER RESEARCH

This final chapter begins with a review of the research questions that motivated this dissertation (section 6.1) and a summary (section 6.2) of the major results of the analyses conducted in chapters 4 and 5 . Then, some implications of these findings for the teaching and learning of collocations and phraseological units in medical English are examined (section 6.3). The last part of this chapter (section 6.4) points out new research directions in the study of the lexico-grammatical patterning of non-specialised vocabulary in science writing and presents a linguistic resource, SciE-Lex, which consists of a lexical database that takes account of the lexico-grammar of general terms in scientific English.

### 6.1 Referring back to the research questions underlying this thesis project

In the introductory chapter, three research questions (described in full in section 1.1) were formulated as the basis of the present investigation; the answer to each of which will now be outlined:
(i) Are Spanish doctors aware of the particularities of the medical genre? This study has shown that Spanish doctors do not necessarily find disciplinespecific terminological vocabulary difficult. Rather, it is non-technical words that pose more difficulties for them. Both the worksheet of exercises and the informants' view of their writing difficulties ${ }^{130}$ have revealed that the idiosyncrasies and conventions of the medical register are problematic for non-native speakers. Despite being able to identify some domain-specific phraseological expressions, they lack knowledge of how to use them appropriately in their written production in English.

[^93](ii) What are the main difficulties the phraseological patterns of abstract nouns in medical English pose for the non-native speakers' medical community?

The comparison between the native corpus (i.e. the HSC) and the non-native production has demonstrated that the lexico-grammatical patterns of the selected abstract nouns in medical discourse are liable to confusion. Evidence from informants' collocational deviations has underlined the following problem areas: (a) unfamiliarity with delexical uses of verbs in combination with abstract nouns (e.g. do research, make a comparison); (b) unawareness of common lexical bundles (e.g. in agreement with, there is [adjective] agreement that); (c) lack of knowledge of certain structures that typically occur in the passive (e.g. "conclusions were drawn") or rather in the active ("their effects make a significant contribution to[...]"); and (d) uncertainty about the different typology of the most frequent adjective collocates (e.g. important conclusion, relative contribution, direct comparison).
(iii) What are the prototypical usage patterns around the following abstract nouns: agreement, comparison, conclusion, contribution and decision in medical English?

The analysis of the collocational patterning of each of the above nouns has pointed to four linguistic processes, which are characteristic of their use in medical discourse: delexicalisation, grammaticalisation, passivisation of periphrastic structures of the type "verb + abstract noun" and an attested preference for the attributive use of adjectives. A summary of the main findings of this thesis project will follow up the above issues.

### 6.2 Summing up of main findings

The study of the empirical data gathered directly from corpus evidence has revealed reliable information on the usage of the following nouns: conclusion, agreement, comparison, contribution and decision in medical English. The native corpus investigation conducted in chapter 4 has provided a characterisation of the phraseological patterning of the selected abstract nouns in the register of the medical community under study. Such exploration of naturally-occurring instances as well as high-frequent abstract noun
collocations has allowed the identification of four main linguistic processes which give account of the domain-specific features concerning the collocational patterns of the nouns in question:
a) frequent use of delexicalised verbs in combination with abstract nouns in restricted verb-noun collocations (e.g. draw a conclusion, reach an agreement, make a comparison, make a contribution, take a decision)
b) recurrent use of lexical bundles in which the abstract noun has acquired a more grammatical role and has become part of a distinctive connective operator (e.g. in agreement with, in/by/for comparison)
c) high frequency of occurrence of periphrastic structures of the type "verb + abstract noun" in the passive voice as opposed to their equivalent cognate lexical verbs, which are more commonly used in active constructions (e.g. several conclusions can be drawn vs. investigators concluded that both mechanisms are associated)
d) attested preference for the use of attributive adjectives premodifying abstract nouns as well as for descriptors to be associated with agreement and conclusion, and classifiers with comparison, contribution and decision.

The above processes have made it evident that the use of abstract nouns tends to be associated with specific grammatical patterns. From the point of view of medical discourse analysis and English for Specific Purposes (ESP), there is much to be said about the phraseological behaviour of abstract nouns in medical English.

Firstly, it has been shown that they are usually combined with semantically empty support verbs (e.g. make, reach, take, draw), whose original meaning has faded away. Through a process of delexicalisation, these verbs have gained a more grammatical role and simply perform a verbal function,
whereas the abstract nouns they collocate with can be said to carry the semantic content of the whole multiword unit. This redistribution of meaning across lexical items underlines the close interrelationship between the verb and the abstract noun associated in collocation with it (e.g. draw a conclusion, reach an agreement, make a comparison, make a contribution, take a decision). In addition, such periphrastic uses have been found to correspond to a morphologically related verb of equivalent meaning (i.e. conclude, agree, compare, contribute and decide), which contributes to reinforce the delexicalised use of the restricted verb collocates in verb-noun combinations.

Despite being semantically equivalent, the native corpus revealed that the use of a periphrastic structure of the type "verb + abstract noun" was preferred to synthetic constructions with a cognate lexical verb (i.e. conclude, agree and decide) in three (i.e. conclusion, agreement and decision) out of the five abstract nouns analysed. Other noteworthy differences were for example observed between the use of restricted verb-noun collocations and the use of full lexical verbs (i.e. draw/reach a conclusion, reach an agreement and make a decision vs. conclude, agree and decide). While the former tend to appear in passive constructions, the latter are more frequently used in the active voice.

Secondly, the empirical observation of the lexico-grammatical patterning of the selected nouns in the HSC corpus has brought to light the observation that certain recurrent expressions like in agreement with, in/by/for comparison have undergone a process of grammaticalisation and semantic bleaching ${ }^{131}$ and must therefore be analysed as multiword units in which the abstract noun cannot be interpreted in isolation, but as part of an extended unit of meaning that has acquired a new grammatical function. In the lexical bundles examined, the abstract nouns in combination with certain prepositions have taken on a more grammatical role as cohesive devices and thus serve to link different parts of the discourse.

[^94]Finally, the investigation of the most salient patterns of abstract nouns has also informed about the nature of the adjectives associated in combination with them. Data drawn from the HSC have addressed two main issues regarding adjective usage. The first issue relates to the fact that the adjective collocates of the five nouns analysed show a clear preference for attributive position. Very few instances of adjectives qualifying abstract nouns were used predicatively. The second general observation refers to the kind of adjectives being associated with each abstract noun. As pointed out in chapter 4, due to the fact that the publications examined in the HSC corpus are related to medical topics (in the form of observable, demonstrable data), classifiers were expected to outnumber descriptors as the most common premodifiers of abstract nouns in the native corpora.

Evidence from the HSC has revealed that while the nouns comparison, contribution and decision are usually premodified by classifiers, the nouns agreement and conclusion are, surprisingly, more frequently associated with extent, time and evaluation descriptors, which contradicts the observations from the scientific discourse where they are more rarely found (Biber et al. 1999).

The observed regularities have contributed to outline the phraseology around abstract nouns in medical English and also seem to have brought to the forefront the fact that corpus-based analyses are of paramount importance in the identification of the already discussed linguistic phenomena. As noted earlier, the compilation and subsequent examination of a corpus of medical journals has allowed the direct observation of naturally-occurring examples of abstract nouns in context, which otherwise would have been very difficult to analyse.

With the aim of determining whether informants in the study (i.e. a community of twenty-four Spanish practising doctors) were acquainted with the previously identified distinctive features and conventions with regard to the phraseological behaviour of abstract nouns in medical English, a survey was conducted among informants. Bearing in mind that they are intended to
publish their current research in English, the analysis of their lexical expertise with respect to the phraseology of abstract nouns seemed relevant to this research. The results obtained from informants' performance in the worksheet of Exercises enclosed in the survey (cf. Appendix 4) have demonstrated that the already mentioned processes, involved in the collocational patterning of abstract nouns in the native corpus, pose problems for non-native speakers.

Although similarities with expert texts were also present in informants' identification of some usual verb-noun collocations (e.g. reach an agreement, make a comparison, draw a conclusion) and adjective-noun patterns (e.g. general agreement, statistical comparison, logical conclusion, significant contribution, firm decision), the study has shown that on the whole they lack knowledge of the collocational properties of the selected abstract nouns.

A considerable number of deviations found in the worksheet of exercises stress informants' uncertainty over proper collocability of the analysed lexical items. Firstly, several misuses of both restricted and free verb-abstract noun collocations (e.g. *achieve an agreement, *perform a comparison, *lead to a contribution, *draw a decision) as well as an apparent difficulty in distinguishing between similar pairs of words (e.g. do vs. make, reach vs. achieve) have shown that delexicalised uses of verbs are particularly liable to confusion. Whereas the HSC corpus had revealed that free verbs were hardly ever used in combination with the analysed nouns, informants did use a wide range of free verb-noun collocations in their responses (e.g. *perform a comparison, *adopt a decision, *generate a contribution), where a restricted verb would have been expected.

In addition, some deviations in the verb appeared to occur in combination with abstract nouns (cf. section 5.1.4a) and other domain-specific nouns (cf. section 5.1.4c). Informants found it difficult to differentiate the preferred collocates of similar pairs of verbs, which led to inappropriate verb-noun combinations like the following: *make research, *reach weight, *achieve an agreement. These findings seem to indicate that two are the main reasons for this confusion. On the one hand, the fact that these support verbs tend to
collocate with a wide repertoire of nouns might make it difficult for non-native speakers to differentiate their usual collocates. On the other hand, the delexicalised senses of these verbs usually have similar translation equivalents in informants' L1, which may hinder even more their distinction.

A further finding related to informants' misuse of delexicalised verbs in association with abstract nouns suggests that the verbs draw and lead to were found to be remarkably problematic. Recurrent collocations like *draw a decision, *lead to a contribution and *lead to a decision appear to verify that informants had difficulties in discriminating between literal and more figurative senses of both verbs.

As already stated, the influence of informants' L1 was found to be strong, as it led to different types of deviations, which were especially noticeable in the "Fill in the gaps exercise" (cf. section 5.1.1) as well as the "Translation exercise" (cf. section 5.1.2). These two exercises turned out to be particularly useful in the identification of problem areas since they provided participants with instances of real language in context rather than isolated examples of word combinations. Informants' responses to both exercises have supplied a good source of information regarding their familiarity with the structures under study.

Informants' failure to produce appropriate lexical bundles with the nouns agreement and conclusion emerged as a recurrent deviation which was clearly influenced by participants' L1. Data drawn from the HSC corpus had revealed that strings of words like "there is (adjective) agreement that" and "in conclusion" had undergone a process of grammaticalisation and, thus, should be regarded as compositional sequences of words in which the abstract noun, by losing its original semantic content, forms part of an extended unit of meaning which has acquired a more grammatical function.

On the contrary, results from non-native speakers' production seem to indicate that informants were not aware of the peculiarities of the abovementioned lexical bundles. A total of nineteen informants failed to
produce the structure there is agreement that and used other deviant constructions like the use of the passive (e.g. "*an agreement was done") and the anticipatory "if" (e.g. "*it was produced an agreement"), as a means of disguising authorial interpretations. These deviations ${ }^{132}$ underpin the argument that informants' lack of collocational competence made them resort to word-for-word translations. This distinct tendency may also be related to the fact that, as stated in the Survey Content-Based Questions (cf. section 5.3), a $20,8 \%$ of informants claimed to write the first draft of their articles in Spanish and then translated them into English.

The analysis of informants' material has evidenced that L1 influence was also present in some deviations regarding the use of passive forms. Whereas the HSC corpus had shown a preference for the use of verb-abstract noun collocations in passive constructions (e.g. conclusions were drawn, an agreement was reached, a decision must be made), some deviant uses of both the active and the passive voice occurred in informants' production. In particular, their difficulty in translating the Spanish impersonal construction with the reflexive pronoun se (e.g. "no se realizaron comparaciones", "se hicieron las mismas comparaciones") in Exercise 3 (cf. section 5.1.2) has given rise to inappropriate structures where transfer from L1 is most noticeable (e.g. "*did not realise comparisons", "*they made the same comparisons", "* it was made the same comparisons").

Further instances of L1 interference were traced in participants' misuse of three semantically similar adjectives: little, short and small. A lack of knowledge of the adjective collocates of the selected abstract nouns was observed in the following deviations with the adjective short: *short agreement, *short comparison and *short contribution, where little would have been the most appropriate adjective collocate. The semantic similarity among the three adjectives as well as their similar translation equivalents in Spanish may have contributed to informants' deviant collocations.

[^95]In addition, the analysis conducted in chapter 5 revealed informants' unawareness of the most common adjective collocates of the nouns in question. This assertion seems to be supported by a number of questionable adjective-noun combinations (e.g. ?reliable agreement, ?reliable contribution, ?late agreement, ?late comparison), which neither the HSC corpus nor the $B N C$ gave account of.

Other types of deviation that emerged as particularly frequent referred to morphological aspects. Surprisingly, participants proved to have problems with the morphological form of many general items such as comparison (*comparation, *comparition, *comparision), biological (*biologyc), significant (*significative), substance (*substans) and analyze (*analize). These deviant forms were not expected since all these terms are often used in medical publications and, thus, informants were supposed to be familiar with them. However, such inappropriate forms provide further indication of informants' tendency to transfer structures (morphological forms, in this case) from their L1.

All in all, three general conclusions can be drawn from the analysis of the worksheet of exercises concerning non-native speakers' command over proper collocability of the phraseology around abstract nouns in medical discourse. Firstly, their responses to the exercises have shown that being familiar with certain collocations does not necessarily imply knowing how to use them correctly. Although informants were able to successfully identify acceptable adjective + noun collocations and restricted verb-noun combinations in Exercise 1 (cf. section 5.1.3) and Exercise 4 (cf. section 5.1.4), they also failed to produce those collocations appropriately when a context was provided (Exercise 2 and 4; cf. sections 5.1.1 and 5.1.2, respectively). The second observation made when comparing the mismatch between the HSC corpus and the informants' production points to the fact that the distinctive features of the lexico-grammatical patterning of the five abstract nouns pose many difficulties for non-native speakers.

A further assumption can be made from the survey data. The results obtained have demonstrated that the grammatical and collocational patterns of frequent general abstract nouns ${ }^{133}$ are liable to confusion for informants. This goes in line with their perceptions with regard to their writing process in English (cf. section 5.3). When asked to reflect on their main problem areas when writing their medical articles, they claimed that the use of general words and common expressions as well as the appropriate use of grammatical rules when constructing sentences were difficult aspects of their actual writing up process.

These findings hold a number of implications for the teaching and learning of collocations and phraseological conventions in the disciplinary area under discussion, which will be considered in the following section.

### 6.3 Implications of the study

Several implications can be drawn from the analysis conducted in this study. The investigation of the defining traits of the phraseological behaviour of abstract nouns in a health science corpus (HSC) and the subsequent verification that non-native speakers were unaware of the lexico-grammatical patterning of such units brings to the forefront the relevance of corpus-based studies not only in the characterisation of language but also in the teaching and learning of phraseology in specialised registers.

Recent theory and corpus-based studies (Gledhill 2000, Tognini-Bonelli 2001, Tsui 2005, Nesselhauf 2005, among others) have provided substantiation of the convenience of using collocation evidence obtained from textual corpora in EFL and ESP settings so as to help non-native speakers focus on slices of real language as well as high-frequent combinations of words. As shown in this research, empirical corpus evidence has been essential so as to identify the main patterns of word co-occurrence associated with the selected abstract nouns.

[^96]This analysis has also revealed informants' lacking familiarity with the most salient collocational patterns and lexical bundles that tend to occur in combination with the analysed nouns. To this respect, it is worth underlining that the use of a corpus-based approach has served a vital role in the identification of the phraseology of such nouns in medical English.

The observations made by rooting informants' lexical and collocational production suggest the need of large-scale studies based on corpus data that give account of the idiosyncrasies of medical discourse. In Gledhill's view, "much of the language involved in (...) [scientific English] ${ }^{134}$ is idiomatic and highly stereotypical in nature" (Gledhill 2000a:116), so in this perspective the examination of language in use is seen as extremely beneficial in providing information about how words are actually used and their natural context of occurrence; that is, showing words, not in isolation, but in terms of their semantic preferences (Sinclair 1991).

As demonstrated in the present dissertation, the control of general words and common expressions frequently found in medical English is regarded as essential in encoding messages to show near-native linguistic competence. This is especially relevant for the discourse community under discussion. Being part of the international medical research community, they are committed to ensuring rapid dissemination of their research findings. This inevitably means that they need to be aware of the conventions as well as the good academic style characteristic of medical writing, so that their research articles are accepted for publication in the prestige journals of their various specialised fields.

An issue recurring throughout the study of the errors produced by informants is that most instances that were particularly problematic consisted of frequent everyday expressions in medical written production. This finding goes in line with Gledhill's assumption that "non-technical lexical items in science writing are involved in highly specific and consistent grammatical systems" (Gledhill

[^97]2000b:214) and, thus, they often constitute sources of confusion. In this context, informants' failure to produce appropriate collocations highlights the need to improve non-native speakers' competence with regard to the collocational patterning distinctive of scientific discourse.

As already pointed out, researchers must adhere to the appropriate collocations and the conventionalized phraseological properties of the written community they belong to, so that their potential readership is not distracted by deviant expressions and can thus read fluently and focus on the content. The present research aimed at developing this generalisation by comparing the attested mismatch between collocation evidence obtained from the HSC corpus and non-native speakers' collocational performance in the worksheet of exercises, especially designed for this study.

Informants' deviations concerning the lexico-grammatical patterns associated with abstract nouns have also indicated that the analysis of collocations and phraseology in scientific English deserve further attention. According to Gledhill (2000b), the notion of phraseology is central in the characterisation of scientific discourse:

> "The notion of phraseology implies much more than inventories of idioms and systems of lexical patterns. Phraseology is a dimension of language use in which patterns of wording (lexico-grammatical patterns) encode semantic views of the word, and at a higher level idioms and lexical phrases have rhetorical and textual roles within a specific discourse." (Gledhill 2000b:202)

Within this frame, the study of the recurrent lexico-grammatical patterning of words, rather than isolated terms, becomes a substantial part of the defining characteristics of a given discourse community. As Barnbrook (2007) puts it:

[^98]restrictions, but instead largely on the basis of preconstructed phrases composed largely of delexicalised frequent words." (Barnbrook 2007:193)

Given this view, that a high proportion of the language produced by native speakers appears to consist of prefabricated recurrent chains of words in which at least one of the elements has been delexicalised, large-scale corpus studies showing the linguistic phenomena observed in chapter 4 (i.e. delexicalisation, grammaticalisation, distribution of meaning across different units) are seen as extremely useful for the description of the language involved in specialised registers.

To this respect, results from this study on the collocational and colligational patterns of the nouns conclusion, agreement, comparison, contribution and decision in the HSC corpus appear to suggest that native speakers make use of frequent prefabricated chunks (e.g. restricted verb-noun collocations in which the verb has lost its primary meaning, lexical bundles which have undergone a gradual process of grammaticalisation) of which non-native speakers do not seem to be aware.

What can be inferred from their uncertainty over proper collocability around abstract nouns is that their written production would fail to resemble nativelike naturalness and fluidity. It has been claimed (Gledhill 2000a/b; TogniniBonelli 2001; Wray 2002) that a good command of the collocational patterns associated with lexical units leads to a more effective communication among the members of a given discourse community:
"Collocations in science writing are undoubtedly selected as the best ways of expressing certain ideas, although this selection does not mean that these expressions are the best, or the only possible selections, the selection is largely a feature of convention and acceptability within the discourse community." (Gledhill 2000a:133)

Bearing in mind, thus, that native production is characterised by the use of conventionalized phraseological units which shape the discourse of a particular community, non-native speakers must be able to use not only grammatically correct structures and select appropriate lexical items but also, most importantly, choose the right combinations of words so as to show nearnative competence.

Another inference about informants' inappropriate usage of the abstract nouns examined in the worksheet of exercises is that most deviations are related to the defining traits of the lexico-grammatical patterning of the nouns in question; namely, delexicalisation, grammaticalisation, use of periphrastic structures in passive constructions and the use of classifiers as opposed to descriptors as attributive adjective collocates. These attested deviations reinforce the assumption that the lexical patterning around abstract nouns poses apparent difficulties for non-native speakers.

A further implication of this study that has emerged from the identification of the above problem areas is that the teaching of phraseology should be central in EFL and ESP learning contexts so as to improve non-native speakers' collocational competence in English. As Gledhill (2000a) claims:
> "the direct correspondence between lexis and grammar is now so pervasive that it is difficult to conceive of a general characterization of science writing or the design of teaching materials for the benefit of science writers which can afford to ignore phraseology as a central level of analysis." (Gledhill 2000a:130-131)

Recent studies (Hunston 1995; Cowie 1998; Granger 1998; Howarth 1996; Hunston \& Francis 2000; Gledhill 2000; Kaszubski 2000; Wray 2002; Nesselhauf 2005, among others) have stressed the important role played by prefabricated units in language learning. As the present analysis has shown, these units constitute a considerable proportion of native speakers' linguistic production, so it seems reasonable to conclude that they should be given
central attention in EFL teaching methods and materials ${ }^{135}$. However, in Nesselhauf's (2005) view, further studies that take into account the difficulties non-native speakers have with collocational patterns are needed:
> "Although collocations have received increasing attention in recent years (Granger 1998c:159; Howarth 1998a:30), we are still far from the development of a coherent methodology and even further from a wide-spread and systematic treatment of collocations in language teaching materials and syllabi." (Nesselhauf 2005:3)

The results from this study (cf. chapter 5) indicate that informants appeared to be familiar with some restricted verb-noun collocations, which were frequently used in the HSC corpus, such as draw a conclusion, make a comparison and reach an agreement. Similarly, they also produced appropriate adjective-noun collocates like general agreement, statistical comparison and logical conclusion. It seems also worth noting that these acceptable word combinations were mainly found in the matching exercises (cf. sections 5.1.3 and 5.1.4). However, the analysis of the other two exercises (i.e. "Fill in the gaps exercise" [cf. section 5.1.1] and "Translation exercise" [cf. section 5.1.2]), where informants were expected to produce sequences of words in a given context, highlighted informants' inability to produce appropriate restricted verb-noun collocations as well as lexical bundles, which are central to the creation of scientific discourse.

The above finding reveals that mere exposure to or familiarity with certain multiword units does not necessarily entail that users will know how to use them correctly when writing their English texts. This assumption underlines even more the adequacy of teaching collocations explicitly (Kaszubski 2000; Nesselhauf 2005) in order to help non-native speakers improve their written production and feel more confident when expressing themselves in English. As discussed in section 5.3, data from the Survey Content-Based Questions

[^99]informed about participants' view of their main problem areas when producing their medical articles in English. Their views pointed chiefly to three main aspects:
a) the use of general words and common expressions in English
b) the distinction between similar pairs of words
c) the use of appropriate grammatical rules when building up a text

These three aspects along with the attested deviations discussed in sections 5.1 and 5.2 justify the usefulness of providing informants with resources and tools especially designed to improve their collocational competence in English. Although the main aim of the present research was, on the one hand, exploring the lexico-grammatical patterns of abstract nouns in medical English and, on the other, testing informants' knowledge of and ability to produce appropriate word combinations, it was also decided to inquire participants about the resources and tools that could facilitate their writing process in English.

As to the tools learners suggested, they could be grouped into three main categories which reflect informants' personal perception of what resources they felt that could have a positive effect on their writing:
a) lexical devices and on-line resources: lexical databases of common errors, dictionaries of collocations and automatic translators
b) human resources: training courses on writing techniques and linguistic support on behalf of language specialists.
c) learner's attitude: further exposure to reading and writing.

Clearly, along with the explicit teaching of collocations in EFL and ESP contexts, the development of a corpus-based linguistic reference tool that takes account of the lexico-grammar of general vocabulary in scientific English would extensively contribute to bridge the gap between real language in use and non-native speakers' uncertainty over proper collocability in
medical discourse. In the following section new research directions raised by the results obtained from this study as well as some suggestions for the creation of such a tool will be put forward.

### 6.4 New research directions

As stated in the previous section, the findings drawn from the analysis of both the HSC and the informants' production with regard to the phraseological behaviour of abstract nouns in medical English have given rise to several implications for the teaching and learning of phraseology in specific genres. However, it is also worth underlying that the analysis carried out in this study has also some limitations which will constitute my future research directions.

The present research has left many dimensions of the lexico-grammatical patterning of medical discourse that remain unexplored and need to be investigated further. Firstly, the creation of useful analytic reference tools that improve Spanish scientists' usage of multiword units in medical English seems to be a fruitful area of research. It has been long acknowledged (Granger 1998; Altenberg \& Granger 2001; Nesselhauf 2005, among others) that disambiguating word senses and how different lexical units are combined to form chunks of language may be tough for non-native speakers. Furthermore, some specialised dictionaries (i.e. the Elsevier's Enciclopaedic Dictionary of Medicine, the Oxford Dictionary of Biochemistry and Molecular Biology) lack contextual information, which often leads to unsatisfactory lookup experiences. Therefore, a reference tool which provides information about collocations in scientific English could be beneficial for the Spanish scientific community.

To this respect, a research group at the Department of English of the University of Barcelona ${ }^{136}$ is currently developing a lexical database of general terms in scientific English, SciE-Lex, whose main aim is helping the Spanish scientific community to use the appropriate collocational patterns in their articles.

[^100]With the aim of storing and assembling the information that is considered to be essential for the target user of such a tool, SciE-Lex includes the most usual collocations of English non-technical words used in scientific language. This lexical database displays information about the meanings and the grammatical and collocational patterns of general terms frequently produced in scientific discourse. In later stages, SciE-Lex will also incorporate lexical bundles, as these compositional recurrent sequences have also been found to be problematic among non-native speakers (cf. chapter 5).

Some other resources publicly available, such as already existing technical and scientific monolingual dictionaries ${ }^{137}$, merely provide terminological and encyclopaedic information or, in the case of bilingual and multilingual dictionaries, they simply offer translation equivalents without further information about the context on which the meaning of a given lexical entry depends. Consequently, the development of lexical databases like SciE-Lex and specialised dictionaries that take into account the lexico-grammatical patterning of lexical units and acknowledge that meaning is highly dependent on the context of co-occurrence of the word (Barnbrook 2007:191) is considered to be highly useful to improve non-linguist user's performance.

In addition, the present study has also made it evident that further corpusbased studies on collocations of both native and non-native production in scientific English are needed so as to contribute to a thorough characterisation of the discourse community as well as pinpoint non-native speakers' difficulties and design efficient collocation teaching materials. For a better understanding of non-native speakers' main problems as far as their written production is concerned, the examination of a large text corpus consisting of their published articles in English would also be beneficial in order to evaluate their collocational performance against native corpus evidence in the light of greater amounts of data.

[^101]There is also an urgent need to explore the materials used in EFL and ESP contexts for the teaching of collocations in scientific English. Informants to the sample stated that they used to attend both ESP and content-based training courses in English on a regular basis (cf. section 3.4). However, very little is known about the materials, in the form of coursebooks, writing manuals, workbooks and grammars, among others, used for the teaching of English collocations in health sciences. Future work should be applied to the analysis of these sources for further insights into the way collocations are taught. As collocational patterns are essential to the construction of knowledge in the disciplinary area, it is firmly believed that research on lexico-grammar will provide the framework for the creation of improved collocation teaching materials.

As can be inferred from all these considerations, there is clearly much work to be done in the area of phraseology and lexical patterning of general vocabulary in specialist registers. This thesis was meant to be an attempt at identifying the pervasive idiosyncrasies of collocations in medical English and the difficulties that the lexico-grammar of abstract nouns poses for nonnatives speakers. It is hoped, however, that this research work will stimulate larger-scale follow-up corpus-based studies that contribute to a better understanding and teaching of the complexity of multiword units in scientific discourse.

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## Appendix 1

$\qquad$

Fichas de ejercicios (Worksheets)

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## Appendix 1

Full Name:
Nationality:
Age Group (please circle): $\quad 25-30 \quad 30-40 \quad 40-50 \quad+50$ University studies (Degree):
Graduated from the University of $\qquad$ in $\qquad$

1. How long have you been studying English?
2. Have you ever lived abroad -in an English speaking country-? If so, how long?
3. How long have you been working in this hospital? What is your MIR speciality (field / research work)?
$\qquad$
$\qquad$
4. Have you taken any course related to your speciality in English? When? What was the course about?
$\qquad$
$\qquad$
5. Do you ever read academic papers / scientific articles in English? If so, how often? Which books / journals, etc. do they come from?
$\qquad$
$\qquad$
$\qquad$
6. Do you usually write scientific papers in English? Which journals do you usually publish in?
$\qquad$
$\qquad$
$\qquad$
7. When writing a paper in English, what is your writing process:
a) first you write your contribution in your mother tongue and then translate it into English.
b) you make a draft in English and then look up unknown words or expressions.
c) you ask for some expert advice before handing in your paper.
d) Other (Please specify): $\qquad$

## Appendix 1

8. What are your main problems when writing a paper in English? Rank the following aspects in order of difficulty:

| EASY |  | DIFFICULT |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

> Specific (medical) terminology in English
$>$ General words / expressions most commonly used in this type of publications
$>$ Distinction between similar pairs of words (i.e. do / make)
$>$ Distribution of paragraphs
> Grammatical rules when constructing sentences
$>$ Others (Please specify): $\qquad$
9. Can you think of any tool / resource to help you improve your writing of scientific articles in English (e.g., a lexical database of the most frequent general words / expressions in academic writing, specialized dictionaries, etc.)?
$\qquad$
$\qquad$
10. How long did you spend completing this questionnaire?

THANK YOU very much for your HELP and TIME devoted to answering this questionnaire!

## Appendix $2^{*}$ Survey Question 10: Informants' time estimates in completing the questionnaire



Figure 66 Survey Question 10: Informants' time estimates in completing the questionnaire

[^102]
## Appendix 3

# FORMULARIO de CONSENTIMIENTO para UTILIZACIÓN de DATOS 

## Proyecto de investigación: Tesis doctoral "Delexicalisation and Semantic Bleaching of Noun Patterns in a Corpus of Scientific English"1

## Investigadora:

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## Descripción del estudio:

Para la elaboración de la tesis doctoral arriba referenciada, la investigadora ha confeccionado unas fichas de ejercicios que serán distribuidas entre l@s participantes en este estudio. Los datos resultantes de dicho estudio serán analizados posteriormente y podrán ser objeto de publicaciones futuras.

## Protección de datos:

La investigadora se compromete a preservar el anonimato de l@s participantes. Para ello, las fichas de ejercicios se analizarán sin incluir ningún dato personal que pudiese identificar a l@s sujetos. A cada participante se le asignará un código con el que se podrá hacer referencia a los datos obtenidos en sus cuestionarios. Una vez los datos hayan sido recogidos y se haya asignado un código a cada participante, la investigadora siempre utilizará dicho código para referirse a los datos concretos de cada sujeto.

## Acceso a los resultados por parte de los sujetos:

Cualquier resultado y/o datos que se deriven de la participación de los sujetos en el presente estudio podrán ser facilitados a tod@s aquell@s que firmen el presente formulario de consentimiento.

## Derechos de 1@s participantes:

Se entiende que l@s sujetos pueden ejercer su derecho a negarse a contestar alguna pregunta del cuestionario si así lo estiman oportuno.

Nombre y firma del/ de la participante:

Nombre y firma de la investigadora:
Natalia Judith Laso Martín

[^103]
## WORKSHEETS

1. Match each of the adjectives on the left with a suitable noun from the facing column. Try to use your intuition. Please notice that more than one combination is possible and some of the adjectives can be left out.

2. Predict the words which are missing. Complete the sentences below with a suitable word.
3. The research unit, within four days, $\qquad$ the conclusion that the government was not giving enough.
4. Comparisons between mice have been $\qquad$ .
5. Such a conclusion is $\qquad$ by our observations.
6. The data presented here are not $\qquad$ agreement $\qquad$ the model of Studier and Bandyopadhyay.
7. Further trials are needed before any $\qquad$ can be drawn about the protocol's efficacy.
8. Clinical examination and biochemical screening $\qquad$ an important contribution to the detection of abnormalities.
9. They $\qquad$ the final agreement that clinical examination for defects in hips, vision and hearing, and other congenital abnormalities is less well founded on scientific evidence.
10. Bruce Weir has $\qquad$ many important contributions to population genetic inference theory.
11. These results $\qquad$
$\qquad$ some important conclusions.
12. To assess the cost effectiveness of universal antenatal HIV screening $\qquad$ comparison $\qquad$ selective screening in the UK.
13. Despite these conservative features, our analysis broadly $\qquad$ the recent decision by the Department of Health that HIV testing should be offered universally.
14. $\qquad$ is general agreement $\qquad$ the primitive host cell was anaerobic.
15. It was not possible to $\qquad$ the relative contribution of this glucose derived directly from fructose.
16. They will certainly $\qquad$ the decision the group has made.
17. These multivitamins do not appear to $\qquad$ significant contributions to the parameters tested.

## 3. Provide a suitable translation into English for the following sentences.

1. Se produjo un acuerdo casi unánime entre ambos métodos.
2. No se realizaron comparaciones para determinar diferencias de género ni de edad.
3. En resumen, los resultados de nuestros estudios sugieren que la vaginitis bacteriana no afecta en absoluto a la concepción.
4. Las sustancias analizadas han contribuido de forma poco significativa a disminuir los síntomas de la enfermedad.
5. Antes de que se pueda llegar a conclusiones fiables, los investigadores deben aprender mucho más acerca de la función genética.
6. Se hicieron las mismas comparaciones en los tratamientos de control.
$\qquad$
7. Estas conclusiones biológicas han sido justificadas por múltiples tipos de análisis estadísticos.
$\qquad$
8. Varias organizaciones son las responsables de la toma de decisiones por lo que respecta a la seguridad de las transfusiones.
9. Make, draw, reach, lead to, take and do are highly-frequent verbs in English. They tend to combine with a wide range of words to form fixed expressions. Combine the words below with the verbs provided in the chart.

| action | knowledge | a mistake |
| :---: | :---: | :---: |
| sb's temperature | a suggestion | a contribution |
| damage | a place | obesity |
| research | an effort | (financial) success |
| progress | a photograph | a profit |
| experience | an exam | some writing |
| a conclusion | an agreement | notes |
| a verdict | a guess | a picture |
| a decision | changes | a tablet |
| a comparison | a speech | skills |
| attention | a test | significance |
| weight | consensus | a goal |


| MAKE | DRAW | REACH | LEAD TO | TAKE | DO |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
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## Appendix 5 Typology of Exercises and Aims

| TYPOLOGY OF EXERCISES | DESCRIPTION OF THE EXERCISE | AIMS |
| :---: | :---: | :---: |
| 1. Matching Exercise (adjective + abstract noun) | Participants are asked to use their intuition and match several adjectives with the five abstract nouns under study (conclusion, agreement, comparison, contribution, decision). <br> More than one combination is possible Some adjectives can be left out. | Observe informants' intuition as regards the clause pattern adjective + noun <br> Determine whether they are able to identify frequent collocates <br> Verify whether their performance corresponds to the frequent collocations found in the HSC. |
| 2. Fill in the gaps Exercise | Informants are provided with fifteen sentences extracted from our HSC. These sentences must be completed with a suitable word, which depending on the context may be a preposition or a verb. However, participants are not restricted to use any of those. They are simply told to use "a suitable word". <br> Even though this task could be interpreted as a very restrictive exercise, many combinations are possible. | Explore what collocates informants consider to be the most usual ones in combination with the abstract nouns under study. This will enable us the analysis of whether they are aware of the different collocational patterns those abstract nouns can be associated with in scientific English. The problem areas they may be confronted with will also be identified. |


| 3. Translation Exercise (Spanish into English) | Informants are given eight sentences in Spanish and are asked to translate them into English. Such sentences contain the Spanish equivalents of the abstract nouns under study. | Get to know the strategies used by participants when facing how to express their ideas in English. <br> Find out researchers' use of abstract noun patterns, verb tenses, active and passive voice and their use of prepositions. Thus, this exercise will provide highly valuable information concerning participants' command of English morphology (word forms), syntax (word order) and semantics (word selection). |
| :---: | :---: | :---: |
| 4. Matching Exercise (verb + abstract noun) | Participants are asked to match certain verbs with some of their highly frequent collocates. <br> Some nouns (a verdict, a place, a picture, a photograph, effort, an exam, a speech, a mistake, some writing, notes, (financial) success) introduced are not characteristic of the scientific register as such. However, they are considered to be common collocates of the general verbs provided. | Determine whether informants use their own intuitions when matching those parts of speech. <br> One of the most remarkable features of this exercise is that there is not just one possible / correct answer in some cases, which will facilitate the comparison of the kind of collocates informants would use in their papers with the actual collocates found in the HSC corpus. |

## Appendix 6 Informants' translations to sentences in Exercise 3

| 1) Se produjo un acuerdo casi unánime entre ambos métodos There was almost perfect agreement between the two methods |  |
| :---: | :---: |
| ALB1 | There was almost total agreement between both methods. |
| ALB2 | A near unanimous agreement between both methods was reached. |
| ALB3 | There was an almost complete agreement between both methods. |
| PH1 | An almost unanimous agreement between methods was achieved. |
| PH2 | There was a broad agreement between both methods. |
| PH3 | It was reached an agreement by nearly everyone between methods. |
| PH4 | A near unanimous agreement between both methods was obtained. |
| PH5 | There was an almost general agreement between both methods. |
| PH6 |  |
| PH7 | There was almost a unanimous agreement between both methods. |
| PH8 |  |
| PH9 | Agreement between both methods was almost unanimous. |
| PH10 | Both methods showed almost the same result. |
| PH11 | An almost unanimous agreement was reached between both methods. |
| PH12 | Two methods led to almost the same results. |
| PH13 | An almost unanimous agreement between both methods was reached. |
| HN1 | An almost general agreement between both methods was taken. |
| HN2 | It was produced an agreement between both methods. |
| HN3 | An almost general agreement between both methods was reached. |
| HN4 | An unanimous agreement took place between both groups. |
| HN5 | It was ___ a ___ agreement between both methods. |
| HN6 | An agreement was done between these types of studies. |
| HN7 | The two methods reached an in practice unanimous agreement. |
| HN8 |  |


| 2) <br> Comp | No se realizaron comparaciones para determinar diferencias de género ni de edad. <br> arisons were not made to determine gender or age differences. |
| :---: | :---: |
| ALB1 | Comparations to determine gender and age differences weren't done. |
| ALB2 | Comparisons to analyse differences of gender and age didn't be made. |
| ALB3 | Comparisons analyzing gender and age differences were not made. |
| PH1 | No comparisons to detect differences in gender nor age were done. |
| PH2 | The comparisons to assess differences in gender or age were not done. |
| PH3 | Comparitions were not made to get differents between gender neither age. |
| PH4 | To probe differences between gender and age no comparisons were made. |
| PH5 | There were no comparisons to determine possible gender and age differences. |
| PH6 | No comparisons were made in order to determine differences about sex nor age. |
| PH7 | No comparisons were made in order to determine age and gender differences. |
| PH8 |  |
| PH9 | Comparisons were not made to determine differences between sexes and ages. |
| PH10 | Comparations to assess differences in genre and age hadn't been made. |
| PH11 | Comparisons to determine any difference in gender or age were not made. |
| PH12 | No comparations were made to make differences nor sex nor age. |
| PH13 | Comparisons to determinate sex or age differences were not done. |
| HN1 | Comparisons to determine sex or age differences were not made. |
| HN2 | It wasn't made comparations to determinate differences by genere or age. |


| HN3 | No comparisons were made in order to determinate differences <br> neither gender nor age. |
| :--- | :--- |
| HN4 | Comparations to determine differences of genre or age were not <br> done. |
| HN5 | Comparisons didn't make to determine some differencies nor <br> gender neither age. |
| HN6 | No comparisions were done about any differences of sex. |
| HN7 | Comparisons were not made to determine sex or age differences. |
| HN8 | Did not realise comparisons to decide differences in gender and <br> age. |


| 3) <br> In co vagin | En resumen, los resultados de nuestros estudios sugieren que la vaginitis bacteriana no afecta en absoluto a la concepción. clusion, findings from our studies suggest that bacterial sis has no influence on conception. |
| :---: | :---: |
| ALB1 | In summary, results of our investigations suggest that bacterian vaginytis doesn't affect to conception. |
| ALB2 | In resume, results from our studies suggest that vaginitis bacteriana doesn't affect to conception at all. |
| ALB3 | In summary, our studies' results suggest that bacterial vaginitis does not affect at all to conception. |
| PH1 | In summary, the results of our studies suggest that bacterial vaginitis has no influence on conception. |
| PH2 | In summary, the results of our studies suggest that bacterian vaginitis does absolutely not affect conception. |
| PH3 | To sum up, the results of our studies suggest that the bacterial vaginitis does not affect the pregnancy at all. |
| PH4 | In summary, the results of our studies suggest that pregnancy was not affected by bacterian vaginitis. |
| PH5 | Summarising, our results suggest that bacterial vaginitis does not impair conception/fertility. |
| PH6 | In summary, the results of our studies suggest that bacterial vaginitis doesn't affect to the . $\qquad$ |
| PH7 | In summary, the results of our studies suggest that bacterial vaginitis does not affect conception at all. |
| PH8 | In conclusion, the results of our studies suggest that the bacterial vaginosis do not affect the conception. |
| PH9 | In conclusion, the results of our study suggest that bacterial vaginitis does not affect conception in any way. |
| PH10 | In summary, our results suggest that bacterial vaginitis doesn't affect conception at all. |
| PH11 | In conclusion our results suggest delivery is not affected by bacterian vaginitis. |
| PH12 | As summary, the results of our research suggest that bacterial vaginities does not affect conception at all. |
| PH13 | In summary, the results of our studies suggest that bacterial |


|  | vaginitis doesn't affect to the conception at all. |
| :--- | :--- |
| HN1 | To summarize, the results of our studies suggest that bactetian <br> vaginitis absolutely does not affect to conception. |
| HN2 | To end, the results of our studies tell us that bacterian vaginitis <br> don't affect to the conception at all. |
| HN3 | Summing, the results of our studies suggest the bacterial vaginitis <br> don't affect the conception at all. |
| HN4 | In conclusion, our results suggest that bacterial vaginitis does not <br> interfere with conception. |
| HN5 | In conclusion, our studies results reachs that the bacterian <br> vaginitys don't affect to the concepcion. |
| HN6 | In conclusion, the results of our studies suggest that bacterian <br> vaginitis do not affect conception. |
| HN7 | In summary, ours results suggest that the bacterial vaginitis don't <br> affect the conception at all. |
| HN8 | In summary, the result of our studies suggest that bacterian <br> vaginitis does not affect at all to conception. |


| 4) <br> The an the di | sustancias analizadas han contribuido de forma poco gnificativa a disminuir los síntomas de la enfermedad. ysed substances have not contributed significantly to lessen ase symptoms. |
| :---: | :---: |
| ALB1 | Analysed substances have contributed in a few significative way to diminish disease symptoms. |
| ALB2 | Analysed substances have contribute to decrease disease synthons in a limited way. |
| ALB3 | The analyzed compounds have poorly contributed to lessen the symptoms of the disease. |
| PH1 | Analyzed substances have made a poor significant contribution to decrease disease symptoms. |
| PH2 | The analized substances have contributed poorly to decrease the symptoms of the disease. |
| PH3 | The analized substances have contributed to minimize the illness symptoms in a little significative way. |
| PH4 | The analyzed substances have a little contribution to diminish the symptoms of the disease. |
| PH5 | The contribution of analysed substances on symptoms is marginally significative. |
| PH6 | Analysed substances have contributed not much significant to decrease the symptoms. |
| PH7 | The analyzed substances have contributed in a not very significant way to diminish the illness symptoms. |
| PH8 | The analized drugs have contributed to reduce the symptoms of the illness. |
| PH9 | The substances analyzed have contributed only slightly to reduce the symptoms of this illness. |
| PH10 | Analyzed substances have contributed a little to decrease the symptoms of the illness. |
| PH11 | Substances analyzed have poor significantly contributed to reduce disease symptoms. |
| PH12 | The tested substances have not contributed to diminish the symptoms of the disease in a concrete way. |
| PH13 | The analized substances haven't contributed in a significant way to |


|  | decrease the symptoms of the disease. |
| :--- | :--- |
| HN1 | The substances analized have made a little significative <br> contribution to diminish the disease symptoms. |
| HN2 | The tested substances have contributed in a little significant way to <br> reduce the illness symptoms. |
| HN3 | The analized substances have made a little significant contribution <br> in decreasing the symptoms of the disease. |
| HN4 | The tested substances have not contributed significantly to relief <br> the disease symptoms. |
| HN5 | The analized substans have made a contribution in a short <br> significative way to decrease the illness symthoms. |
| HN6 | The substances studied don't contribute to decrease the sintoms <br> of the illness. |
| HN7 | The analyzed substances have not significantly affected the <br> symptoms of the disease. |
| HN8 | The analised substances had contributed in poorly significant form <br> to decrease the illness symptoms. |

5) Antes de que se pueda llegar a conclusiones fiables, los investigadores deben aprender mucho más acerca de la función genética.
Before firm conclusions can be made, researchers must learn much more about genetic function.

| ALB1 | Researchers have to learn a lot about genetic function before to <br> obtain conclusions. |
| :--- | :--- |
| ALB2 | Before reaching reliable conclusions investigators must learn more <br> about the genetic function. |
| ALB3 | Before we can reach firm conclusions, researchers must learn <br> much more about genetic function. |
| PH1 | Before reaching reliable conclusions, investigators must learn <br> much more on genetic function. |
| PH2 | Before reaching reliable conclusions, investigators must learn <br> much more on genetic function. |
| PH3 | Before reliable conclusions can be made, scientificts must learn a <br> lot about the genetic function. |
| PH4 | Before reaching reliable conclusion investigators must learn to <br> much about genetic function. |
| PH5 | Investigators should improve their knowledge on genetic function <br> in order to reach any reliable conclusion. |
| PH6 | Before to obtain reliable conclusions, the investigators must learn <br> much more about genetic function. |
| PH7 | Before reaching reliable conclusions, the investigators must learn <br> about the genetic function. |
| PH8 | Before they obtain valid conclusions, the investigators must learn <br> much about genetic function. |
| PH9 | Before reliable conclusions can be reached, the researches must <br> learn more about the genetic function. |
| Before reach a reliable conclusion, researchers must learn much |  |
| more about genetic function. |  |
| mefore about genetic functions. |  |
| much more about genetic function. |  |


| PH13 | Before reaching reliable conclusions, the researchers must learn <br> much more about the genetic function. |
| :--- | :--- |
| HN1 | Before reliable conclusions could be reached, investigators should <br> learn much more about the genetic function. |
| HN2 | Before it can lead to the reliable conclusions, researchers have to <br> learn more about genetic function. |
| HN3 | The researchers have to learn much more about genetic function, <br> before reliable conclusions can be reached. |
| HN4 | Before it could reach reliable conclusions, the research team must <br> improve his knowledge about the genetic function. |
| HN5 | Before to get reliable conclusions, the researchers must learn <br> much more about the genetic function. |
| HN6 | Before make some verificable conclusions, the investigators ned to <br> learn a lot about the genetic function. |
| HN7 | Before to reach reliable conclusions, the researchers have to learn <br> more about genetic function. |
| HN8 | Before to achieve reliable conclusions, researchers must learn <br> more about genetic function. |


| 6) |  |
| :--- | :--- |
| Se hicieron las mismas comparaciones en los tratamientos de |  |
| control. |  |
| The same comparisons were made in the control treatments. |  |
| ALB1 | Same comparisons were done in control treatment. |
| ALB2 | The same comparisons in control treatments were made. |
| ALB3 | The same comparisons were made in the control treatments. |
| PH1 | The same comparisons were made in the control treatments. |
| PH2 | The same comparisons were done in the control treatments. |
| PH3 | They made the same comparition in the control treatment. |
| PH4 | In control treatments the same comparisons were made. |
| PH5 | Similar comparisons were performed between control treatments. |
| PH6 | Similar comparisons were made in the control treatments. |
| PH7 | The same comparisons were made in the control treatments. |
| PH8 | It was made the same comparisions in the control treatments. |
| PH9 | The same comparisons were made with the control treatments. |
| PH10 | The same comparations were made in control treatments. |
| PH11 | In control treatments same comparisons were made. |
| PH12 | In control groups the comparations were the same. |
| PH13 | Similar comparations were done with the control treatments. |
| HN1 | The same comparisons were made in control treatments. |
| HN2 | It was made similar comparations on control treatments |
| HN3 | The same comparations in the control treatment were done. |
| HN4 | The same comparations were made in the control treatments. |
| HN5 | They did the same comparisons in the control treatments. |
| HN6 | The same comparisions were done in the control tratament. |
| HN7 | The same comparisons were made in the control treatments. |
| HN8 | They made the same comparations in the control treatments. |

## 7) Estas conclusiones biológicas han sido justificadas por múltiples tipos de análisis estadísticos.

These biological conclusions are justified by multiple types of statistical analyses.

| ALB1 | These biologyc conclusions have been justified by multiple statistical analysis. |
| :---: | :---: |
| ALB2 | This biological conclusions have been justified by numerous stadistical analysis. |
| ALB3 | These biological conclusions have been justified by many types of statistical analyses. |
| PH1 | These biological conclusions have been justified by multiple kinds of statistical analysis. |
| PH2 | These biological conclusions have been supported by multiple types of stadistical analysis. |
| PH3 | These biological conclusions have been justified by a lot of statistical tests. |
| PH4 | To many statistical analysis lead to these biological conclusions. |
| PH5 | Multiple statistical analyses support these biological conclusions. |
| PH6 | These biological conclusions have been justified through multiples types of statistical analyses. |
| PH7 | These conclusions have been justificated by multiple types of statistical analysis. |
| PH8 | This biological conclusions have been supported by different statistical studies. |
| PH9 | These biologyc conclusions have been justified by multiple types of statistical analysis. |
| PH10 | These biological conclusions have been justifyed by a lot of kinds of statistical analysis. |
| PH11 | These biological conclusions have been justified by different statistical analysis. |
| PH12 | These biological conclusions have been justified by sever statistical analyses. |
| PH13 | These biologyc conclusions have been justified by multiple kinds of statistical tests. |


| HN1 | These biological conclusions have been justified by various types <br> of statistical analysis. |
| :--- | :--- |
| HN2 | This biological conclusions have been justificated by several kinds <br> of stadistical analysis. |
| HN3 | These biologyc conclusions have been supported by many kinds <br> of statistical analysis. |
| HN4 | This biologyc conclusions have been justified by many statistical <br> analysis. |
| HN5 | This biological conclusions have been justifiqued for a lot of <br> different stadistics ways. |
| HN6 | The biologyc conclusions have been verificated by a lot of types of <br> statistical analysis. |
| HN7 | These biological conclusions were justifiqued by different statistical <br> analysis. |
| HN8 | These biologyc conclusions had been supported by multiple <br> pattern of statistic analysis. |


| 8) <br> Sever <br> trans | arias organizaciones son las responsables de la toma de ecisiones por lo que respecta a la seguridad de las ansfusiones. organisations are responsible for decision making in ion safety. |
| :---: | :---: |
| ALB1 | Several organitations are responsible of making of decisions about security in transfusions. |
| ALB2 | Several organizations are responsible for making decisions about transfusions security. |
| ALB3 | Several organizations are responsible for the decision-making with respect to transfusions security. |
| PH1 | Several organizations are responsible of decision-making concerning security of transfusions. |
| PH2 | Several organizations are responsible for decision making with respect to transfusion security. |
| PH3 | Some boureaus are responsibles of the decisions taken about transfusion safety. |
| PH4 | About transfusions security many organizations are responsible in taking decisions. |
| PH5 | Several organisations are responsible in decision making with respect to transfusions safety. |
| PH6 | Regarding to transfusions safety, several organizations are responsible for to adopt decisions. |
| PH7 | Various organizations are the ones responsibles of the decision making with respect to the transfusion's security. |
| PH8 | Several organizations are the responsible of the lack of decisions about the security of the transfusions. |
| PH9 | Various organisations are responsible for taking the decision with respect to the safety of transfusion. |
| PH10 | Several organizations are responsible for making decisions about safety of transfusions. |
| PH11 | Several organizations are responsible for taking decisions regarding blood transfusions safety. |
| PH12 | Transfussions follow strict protocols accordingly to some organizations. |


| PH13 | Some organizations are responsable for making decisions <br> regarding the security of transfusions. |
| :--- | :--- |
| HN1 | Several organizations are responsible in taking decisions about <br> transfusion security. |
| HN2 | Very organisations are the responsables of the doing decisions <br> about transfusions security. |
| HN3 | Several organizations are responsible for making decision with <br> respect to the safety of the transfusions. |
| HN4 | Blood transfusion security is surveyed by some organizations. |
| HN5 | Some organizations are responsibles in the decisions about <br> transfusions security. |
| HN6 | A couple of organizations are the responsable of the decisions <br> about the transfusion security. |
| HN7 | Several organizations are responsible in to take decisions about <br> the safety of the transfusions. |
| HN8 | Some organisations are responsible to decision-making with <br> respect to transfusions security. |

## Appendix 7 Informants' verb-noun collocations in Exercise 4: Matching Exercise (verb + abstract noun)

## MAKE ${ }^{1}$

| (financial) SUCCESS | $12,5 \%$ |
| :--- | :---: |
| A COMPARISON | $70,8 \%$ |
| A CONCLUSION | $4,2 \%$ |
| A CONTRIBUTION | $62,5 \%$ |
| A DECISION | $41,7 \%$ |
| A GOAL | $8,3 \%$ |
| A GUESS | $29,2 \%$ |
| A MISTAKE | $79,2 \%$ |
| A PHOTOGRAPH | $4,2 \%$ |
| A PICTURE | $12,5 \%$ |
| A PLACE | 0,0 |
| A PROFIT | $50,0 \%$ |
| A SPEECH | $45,8 \%$ |
| A SUGGESTION | $70,8 \%$ |
| A TABLET | $4,2 \%$ |
| A TEST | $25,0 \%$ |
| *A VERDICT | $8,3 \%$ |
| *ACTION | $4,2 \%$ |


| AN AGREEMENT | $8,3 \%$ |
| :--- | :---: |
| AN EFFORT | $75,0 \%$ |
| AN EXAM | $16,7 \%$ |
| *ATTENTION | $8,3 \%$ |
| CHANGES | $54,2 \%$ |
| CONSENSUS | 0,0 |
| DAMAGE | $29,2 \%$ |
| *EXPERIENCE | $8,3 \%$ |
| KNOWLEDGE | 0,0 |
| NOTES | 0,0 |
| OBESITY | 0,0 |
| PROGRESS | $41,7 \%$ |
| *RESEARCH | $12,5 \%$ |
| somebody's TEMPERATURE | 0,0 |
| *SIGNIFICANCE | $4,2 \%$ |
| SKILLS | 0,0 |
| SOME WRITING | 0,0 |
| WEIGHT | 0,0 |



Figure 67 make + noun collocations provided by informants

[^104]
## Appendix 7 Informants' verb-noun collocations in Exercise 4: Matching Exercise (verb + abstract noun)

## DRAW

| (financial) SUCCESS | 0,0 |
| :--- | :---: |
| A COMPARISON | $4,2 \%$ |
| A CONCLUSION | $41,7 \%$ |
| A CONTRIBUTION | 0,0 |
| ${ }^{*}$ A DECISION | $4,2 \%$ |
| ${ }^{*}$ A GOAL | $4,2 \%$ |
| *A GUESS | $12,5 \%$ |
| A MISTAKE | 0,0 |
| A PHOTOGRAPH | 0,0 |
| A PICTURE | $41,7 \%$ |
| A PLACE | 0,0 |
| *A PROFIT | $4,2 \%$ |
| *A SPEECH | $4,2 \%$ |
| A SUGGESTION | 0,0 |
| *A TABLET | $8,3 \%$ |
| A TEST | 0,0 |
| *A VERDICT | $16,7 \%$ |
| ACTION | 0,0 |


| AN AGREEMENT | 0,0 |
| :--- | :---: |
| AN EFFORT | 0,0 |
| AN EXAM | 0,0 |
| ATTENTION | $25,0 \%$ |
| *CHANGES | $4,2 \%$ |
| CONSENSUS | 0,0 |
| *DAMAGE | $4,2 \%$ |
| *EXPERIENCE | $8,3 \%$ |
| *KNOWLEDGE | $4,2 \%$ |
| *NOTES | $12,5 \%$ |
| OBESITY | 0,0 |
| PROGRESS | 0,0 |
| *RESEARCH | $4,2 \%$ |
| *somebody's TEMPERATURE | $4,2 \%$ |
| *SIGNIFICANCE | $4,2 \%$ |
| *SKILLS | $12,5 \%$ |
| *SOME WRITING | $12,5 \%$ |
| *WEIGHT | $4,2 \%$ |



Figure 68 draw + noun collocations provided by informants

## Appendix 7 Informants' verb-noun collocations in Exercise 4: Matching Exercise (verb + abstract noun)

REACH

| (financial) SUCCESS | $25,0 \%$ |
| :--- | :---: |
| A COMPARISON | 0,0 |
| A CONCLUSION | $41,7 \%$ |
| A CONTRIBUTION | 0,0 |
| A DECISION | $25,0 \%$ |
| A GOAL | $58,3 \%$ |
| *A GUESS | $8,3 \%$ |
| A MISTAKE | 0,0 |
| A PHOTOGRAPH | 0,0 |
| A PICTURE | 0,0 |
| *A PLACE | $50,0 \%$ |
| *A PROFIT | $4,2 \%$ |
| A SPEECH | 0,0 |
| A SUGGESTION | 0,0 |
| A TABLET | 0,0 |
| A TEST | 0,0 |
| A VERDICT | $45,8 \%$ |
| ACTION | 0,0 |


| AN AGREEMENT | $79,2 \%$ |
| :--- | :---: |
| AN EFFORT | 0,0 |
| AN EXAM | 0,0 |
| ATTENTION | 0,0 |
| CHANGES | 0,0 |
| CONSENSUS | $70,8 \%$ |
| DAMAGE | 0,0 |
| *EXPERIENCE | $37,5 \%$ |
| KNOWLEDGE | $29,2 \%$ |
| NOTES | 0,0 |
| *OBESITY | $8,3 \%$ |
| ${ }^{*}$ PROGRESS | $4,2 \%$ |
| RESEARCH | 0,0 |
| *Somebody's TEMPERATURE | $12,5 \%$ |
| SIGNIFICANCE | $41,7 \%$ |
| SKILLS | $33,3 \%$ |
| SOME WRITING | 0,0 |
| *WEIGHT | $29,2 \%$ |



Figure 69 reach + noun collocations provided by informants

## Appendix 7 Informants' verb-noun collocations in Exercise 4: Matching Exercise (verb + abstract noun)

## LEAD TO

| (financial) SUCCESS | $50,0 \%$ |
| :--- | :---: |
| ${ }^{*}$ A COMPARISON | $4,2 \%$ |
| A CONCLUSION | $16,7 \%$ |
| ${ }^{\text {A A CONTRIBUTION }}$ | $12,5 \%$ |
| ${ }^{\text {A A DECISION }}$ | $12,5 \%$ |
| A GOAL | $12,5 \%$ |
| A GUESS | 0,0 |
| A MISTAKE | $16,7 \%$ |
| A PHOTOGRAPH | 0,0 |
| A PICTURE | 0,0 |
| *A PLACE | $8,3 \%$ |
| *A PROFIT | $12,5 \%$ |
| A SPEECH | 0,0 |
| *A SUGGESTION | $4,2 \%$ |
| *A TABLET | $4,2 \%$ |
| A TEST | 0,0 |
| *A VERDICT | $12,5 \%$ |
| *ACTION | $16,7 \%$ |


| AN AGREEMENT | $12,5 \%$ |
| :--- | :---: |
| AN EFFORT | 0,0 |
| AN EXAM | 0,0 |
| ATTENTION | 0,0 |
| CHANGES | $25,0 \%$ |
| CONSENSUS | $29,2 \%$ |
| *DAMAGE | $29,2 \%$ |
| EXPERIENCE | $20,8 \%$ |
| KNOWLEDGE | $41,7 \%$ |
| NOTES | 0,0 |
| OBESITY | $75,0 \%$ |
| *PROGRESS | $29,2 \%$ |
| *RESEARCH | $8,3 \%$ |
| somebody's TEMPERATURE | 0,0 |
| *SIGNIFICANCE | $16,7 \%$ |
| *SKILLS | $8,3 \%$ |
| SOME WRITING | 0,0 |
| *WEIGHT | $12,5 \%$ |



Figure 70 lead to + noun collocations provided by informants

## Appendix 7 Informants' verb-noun collocations in Exercise 4: Matching Exercise (verb + abstract noun)

TAKE

| (financial) SUCCESS | 0,0 | AN AGREEMENT | 0,0 |
| :---: | :---: | :---: | :---: |
| A COMPARISON | 0,0 | AN EFFORT | 0,0 |
| A CONCLUSION | 0,0 | AN EFFORT | 0,0 |
| *A CONTRIBUTION | 4,2\% | AN EXAM | 25,0\% |
| A DECISION | 29,2\% | *ATTENTION | 29,2\% |
| A GOAL | 0,0 | CHANGES | 0,0 |
| A GUESS | 25,0\% | CONSENSUS | 0,0 |
| *A MISTAKE | 4,2\% | DAMAGE | 0,0 |
| A PHOTOGRAPH | 95,8\% | *EXPERIENCE | 16,7\% |
| A PICTURE | 41,7\% | *KNOWLEDGE | 16,7\% |
| A PLACE | 41,7\% | NOTES | 87,5\% |
| *A PROFIT | 4,2\% | *OBESITY | 4,2\% |
| A SPEECH | 0,0 | PROGRESS | 0,0 |
| A SUGGESTION | 0,0 | *RESEARCH | 4,2\% |
| A TABLET | 70,8\% | somebody's TEMPERATURE | 54,2\% |
| A TEST | 20,8\% | *SIGNIFICANCE | 8,3\% |
| A VERDICT | 8,3\% | *SKILLS | 4,2\% |
| ACTION |  | *SOME WRITING | 8,3\% |
| ACTION | 50,0\% | WEIGHT | 29,2\% |



Figure 71 take + noun collocations provided by informants

Appendix 7 Informants' verb-noun collocations in Exercise 4: Matching Exercise (verb + abstract noun)

DO

| (financial) SUCCESS | 0,0 |
| :--- | :---: |
| A COMPARISON | $16,7 \%$ |
| A CONCLUSION | 0,0 |
| A CONTRIBUTION | $12,5 \%$ |
| A DECISION | 0,0 |
| ${ }^{*}$ A GOAL | $4,2 \%$ |
| ${ }^{*}$ A GUESS | $4,2 \%$ |
| ${ }^{*}$ A MISTAKE | $8,3 \%$ |
| A PHOTOGRAPH | 0,0 |
| A PICTURE | 0,0 |
| A PLACE | 0,0 |
| A PROFIT | 0,0 |
| A SPEECH | $37,5 \%$ |
| ${ }^{*}$ A SUGGESTION | $16,7 \%$ |
| ${ }^{\text {A A TABLET }}$ | $4,2 \%$ |
| A TEST | $58,3 \%$ |
| A VERDICT | 0,0 |
| ${ }^{*}$ ACTION | $12,5 \%$ |


| AN AGREEMENT | 0,0 |
| :--- | :---: |
| *AN EFFORT | $20,8 \%$ |
| AN EXAM | $58,3 \%$ |
| ${ }^{\text {AATTENTION }}$ | $8,3 \%$ |
| ${ }^{*}$ CHANGES | $20,8 \%$ |
| CONSENSUS | 0,0 |
| DAMAGE | $54,2 \%$ |
| EXPERIENCE | 0,0 |
| KNOWLEDGE | 0,0 |
| NOTES | 0,0 |
| OBESITY | 0,0 |
| *PROGRESS | $29,2 \%$ |
| RESEARCH | $54,2 \%$ |
| Somebody's TEMPERATURE | 0,0 |
| ${ }^{*}$ SIGNIFICANCE | $4,2 \%$ |
| ${ }^{\text {SSKILLS }}$ | $8,3 \%$ |
| SOME WRITING | $66,7 \%$ |
| WEIGHT | 0,0 |



Figure 72 do + noun collocations provided by informants

Appendix 8 Survey Content-Based Question 8: Informants' selfevaluation of their main problem areas when writing in English

SPECIFIC TERMS

|  |  | Frequency | Percent |
| :--- | :---: | ---: | ---: |
| Valid | very easy | 10 | 41,7 |
|  | easy | 11 | 45,8 |
|  | not so easy | 2 | 8,3 |
|  | difficult | 1 | 4,2 |
|  | Total | 24 | 100,0 |
|  |  |  |  |



Figure 73 Use of specific (medical) terminology when writing in English

Appendix 8 Survey Content-Based Question 8: Informants' selfevaluation of their main problem areas when writing in English

GENERAL WORDS

|  |  |  |  |
| :--- | :---: | ---: | ---: |
|  |  | Frequency | Percent |
| Valid | very easy | 4 | 16,7 |
|  | easy | 6 | 25,0 |
|  | not so easy | 11 | 45,8 |
|  | difficult | 3 | 12,5 |
|  | Total | 24 | 100,0 |
|  |  |  |  |



Figure 74 Use of general terms when writing in English

Appendix 8 Survey Content-Based Question 8: Informants' selfevaluation of their main problem areas when writing in English

SIMILAR PAIRS OF WORDS

|  |  |  |  |
| :--- | :--- | ---: | ---: |
|  |  | Frequency | Percent |
| Valid | easy | 2 | 8,3 |
|  | not so easy | 10 | 41,7 |
|  | difficult | 11 | 45,8 |
|  | extremely | 1 | 4,2 |
|  | difficult | 24 | 100,0 |
|  | Total |  |  |



Figure 75 Distinction between similar pairs of words when writing in English

Appendix 8 Survey Content-Based Question 8: Informants' selfevaluation of their main problem areas when writing in English

PARAGRAPH DISTRIBUTION

|  |  | Frequency | Percent |
| :--- | :--- | ---: | ---: |
| Valid | very easy | 1 | 4,2 |
|  | easy | 7 | 29,2 |
|  | not so easy | 13 | 54,2 |
|  | difficult | 2 | 8,3 |
|  | Total | 23 | 95,8 |
| Missing | System | 1 | 4,2 |
| Total |  | 24 | 100,0 |



Figure 76 Paragraph distribution when writing in English

Appendix 8 Survey Content-Based Question 8: Informants' selfevaluation of their main problem areas when writing in English

GRAMMAR RULES

|  |  | Frequency | Percent |
| :--- | :--- | ---: | ---: |
| Valid | easy | 4 | 16,7 |
|  | not so easy | 6 | 25,0 |
|  | difficult | 11 | 45,8 |
|  | extremely | 3 | 12,5 |
|  | difficult | 24 | 100,0 |
|  | Total |  |  |
|  |  |  |  |



Figure 77 Grammatical rules when constructing sentences in English


[^0]:    ${ }^{1}$ The Health Science Corpus (HSC)
    ${ }^{2}$ Are Spanish doctors aware of the particularities of the medical genre? and what are the main difficulties the phraseological patterns of abstract nouns in medical English pose for the non-native speakers' medical community?, respectively.

[^1]:    ${ }^{3}$ (a) Appendix 1: Survey; (b) Appendix 2 Survey Question 10: Informants' time estimates in completing the questionnaire; (c) Appendix 3: Consent form; (d) Appendix 4: worksheet of Exercises; (e) Appendix 5: Typology of Exercises and Aims; (f) Appendix 6: Informants' translations to sentences provided in Exercise 3;
    (g) Appendix 7: Informants' verb-noun collocations in Exercise 4: Matching Exercise (verb + abstract noun) and (h) Appendix 8 Survey Content-Based Question 8: Informants' self-evaluation of their main problem areas when writing in English.

[^2]:    ${ }_{5}^{4}$ Collins Birmingham University International Language Database.
    ${ }^{5}$ Based on the Bank of English, which today amounts to 2,5 billion words.

[^3]:    ${ }^{6}$ This corpus was created in the 1990s and it consists of a collection of 200 million words. It includes a general corpus, a learner corpus and an ELT corpus. Its main particularity lies in the fact that it constitutes the first ELT dictionary to be informed by electronic collections of authentic foreign language data.

[^4]:    ${ }^{7}$ The ICLE Corpus consists of 2 million words and contains EFL learner essays.
    ${ }^{8}$ http://www.longman-elt.com/dictionaries/corpus/lclearn.html

[^5]:    ${ }^{9}$ This interconnection between lexis and grammar has been extensively documented in the literature. The interested reader will find further discussion of this linguistic approach in the following studies: Sinclair 1991/2004; Halliday 1992; Francis et al. 1996/1997/1998; Hunston, Francis \& Manning 1997; Hunston and Francis 1998/2000; Singleton 2000; Tognini-Bonelli 2001; Hunston 2002/2007; Stubbs, 2001; Wray 2002; Deignan 2005; Hoey 2005; Groom 2005 and Hyland 2008.

[^6]:    ${ }^{10}$ Further studies on pattern grammar can also be found in Hasan 1987/1996; Francis, Manning \& Hunston 1997 and Hunston \& Francis 2000.

[^7]:    11 "you shall know a word by the company it keeps" (Firth 1957:179) .

[^8]:    ${ }^{12}$ Howarth (1996) also mentions a third tradition which has lately gained much attention. This new approach to the notion of collocation, introduced by linguists such as Palmer (1933) \& Hornby (1954, tackles the difficulties that phraseological units pose for language learners (Howarth 1996:25). Further discussion on the role of phraseology in language learning and teaching will be put forward in section 2.4.

[^9]:    ${ }^{13}$ In Howarth's (1996) words, idiomatic expressions are: "combinations that have a unitary meaning that cannot be derived from the meanings of the components." (Howarth 1996:47)
    ${ }^{14}$ These examples have been taken from Cowie (1981).
    ${ }^{15}$ Unrestricted or free combinations are defined as "combinations of two or more words in which the elements are used in their literal sense. Each component may be substituted without affecting the meaning of the other." (Howarth 1996:47)
    ${ }^{16}$ Cf. Footnote 14

[^10]:    ${ }^{17}$ Studies in this area are, for example, Pawley \& Syder 1983; Fillmore, Kay \& O'Connor 1988; Nattinger \& DeCarrico 1992; Moon 1994; Hyland 2008.

[^11]:    ${ }^{18}$ The Health Science Corpus (HSC); cf. chapter 3.

[^12]:    ${ }^{19}$ See Howarth 1996/1998; Moon 1998; Hunston \& Francis 2000; Wray 2002; Oakey 2002a/b; Biber 2006; Hyland 2008; Granger \& Meunier 2008.

[^13]:    ${ }^{20}$ Other linguists who have stressed the importance of analysing the prototypical phraseological expressions in different genres and registers are Lewis 1996; Williams 1998/1999/2002; Biber 2006 and Scott \& Tribble 2006.

[^14]:    ${ }^{21}$ Further genre analyses can be found in Biber et al. 1999; Lee 2001; Lee \& Swales 2006 and Scott \& Tribble 2006.
    ${ }^{22}$ In his analysis of scientific prose, Master (1991) pays special attention to writers with an Asian background.

[^15]:    ${ }^{23}$ This term is used following McEnery et al.'s (2006) perspective; that is, in a general sense; without making a sharp distinction between corpus-based and corpus-driven approaches.

[^16]:    ${ }^{24}$ The Professional English Research Consortium (PERC) has developed a 100 million word corpus of Professional English, which has been recently released.
    ${ }^{25}$ The data corpus was compiled as part of a research project, 'Creation of a Database of Lexical Combinations in Scientific English", financed by the Spanish Ministry of Science and Education and FEDER (BFF2001-2988). Within this project, co-ordinated by Dr. Isabel Verdaguer (University of Barcelona), the research team developed SciE-Lex, a dictionary that provides contextual information on usage as well as the combinatorial potential of words commonly used in scientific registers.
    ${ }^{26}$ All these articles correspond to the years 1998 and 1999.
    ${ }^{27}$ Biology: Genes and Development (40 articles), Genetics (54 articles), Journal of Cell Biology (26 articles), The American Journal of Primatology (20 articles), Biological Control (97 articles), The Journal of Experimental Zoology (32 articles), BioEssays (99 articles), Integrative Biology (18 articles), Zoo Biology ( 65 articles); biochemistry: Biochemical Journal ( 53 articles), The Embo Journal ( 64 articles); medicine: Journal of Clinical Investigation (53 articles), British Medical Journal (58 articles), Journal of Bacteriology (39 articles). It is worth mentioning that the informants in our study (cf. section 3.3.2) regarded these journals as very relevant to the scientific community.

[^17]:    ${ }^{28}$ © Mike Scott \& Oxford University Press, 1998 (http://www.lexically.net/wordsmith/)

[^18]:    ${ }^{29}$ Ibid.

[^19]:    ${ }^{30}$ Key Word in Context; that is, a computer-generated set of concordance lines in which the node word is centred in each line.

[^20]:    ${ }^{31}$ This was especially noticeable in Exercise 1, where data revealed a low percentage of occurrence of some evaluative adjectives in combination with abstract nouns in the HSC (see Table 29 in section 5.1.3) ${ }^{32}$ http://www.natcorp.ox.ac.uk/

[^21]:    ${ }^{33}$ This is a central idea in corpus linguists
    34 In Teubert's \& Cěrmáková's words: "we are only justified in claiming that a given corpus is representative of a discourse, however we have defined it, if we have, at least in principle, access to all the texts the discourse consists of." (Teubert \& Cěrmáková 2004: 117).

[^22]:    ${ }^{35}$ This worksheet of exercises will be presented in section 3.5.
    ${ }_{37}^{36}$ See Appendix 2.
    ${ }^{37}$ Identification codes consist of the acronym of the hospital each informant was working at; namely, ALB (Complejo Hospitalario Universitario de Albacete), PH (Hospital Universitario Puerta de Hierro) and HN (Hospital de Navarra), together with a number as there is more than one subject from each hospital.

[^23]:    ${ }^{38}$ MIR stands for "médico interno residente"; it refers to a public medical examination used to judge progress of medical students towards becoming doctors and being allowed to practise medicine in Spain.

[^24]:    ${ }^{39}$ This quotation comes from a personal communication on August 17 2007: "depending on the results obtained in the [MIR] examination, one can choose what speciality and where to practise it; you may go far away and do what you really want to or stay where you prefer and do what is left...; this period lasts between 3-5 years. Afterwards, you are a proper specialist and can work in either private or state medical centres (very often with low-paid contracts). Time goes by and if you pass an official examination, you become what is called 'personal estatutario', which is a kind of civil servant. Studying in a place and being trained somewhere else is a very commonplace among doctors. In the past, people used to be trained in the 'best hospitals' and then came back to their home place to practise medicine. Nowadays things have changed: it is more likely to get a post in a place where they know you, so it is better to get your training where you studied."
    ${ }^{40}$ There were originally twenty-five questionnaires but one of them was disregarded as the informant had not filled in that form.

[^25]:    ${ }^{41}$ Cf. Footnote 38

[^26]:    ${ }^{42}$ This figure should be taken cautiously as informants had just some (unspecified) hours of English instruction per year.
    ${ }^{43}$ Two informants (ALB3, PH8) were disregarded as they did not provide any information concerning this issue.

[^27]:    ${ }^{44}$ Although question 2 explicitly asked informants about their stays in an English-speaking country, PH5 included her time spent in Sweden. This information was disregarded.
    ${ }^{45}$ Cf. Footnote 42

[^28]:    ${ }^{46} \mathrm{COU}$ stands for "Curso de Orientación Universitaria" and refers to a course students must take so as to be admitted to university studies at any Spanish university.
    47 "médico interno residente" (cf. Footnote 38)

[^29]:    ${ }^{48}$ lbid.

[^30]:    ${ }^{49}$ European Federation of Endocrine Societies.

[^31]:    ${ }^{50}$ The EFES is aimed at promoting endocrinology in Europe.

[^32]:    51 "I write scientific papers in English but not very often. I have only published in Conference Proceedings. Indeed, I still haven't published in any English journal.'
    ${ }^{52}$ I was aware of the fact that all the participants were included as authors in Pubmed, which is a service of the U.S. National Library of Medicine that includes over 17 million citations from MEDLINE and other life science journals for biomedical articles back to the 1950s.

[^33]:    ${ }^{53}$ Cf. Appendix 1
    ${ }^{54} \mathrm{Cf}$. Appendix 3

[^34]:    ${ }^{55}$ The actual worksheet of exercises are included in Appendix 4 and a Summary of the typology of exercises along with the aims pursued in each activity can be seen in Appendix 5.
    ${ }_{57}^{56}$ (poco ~ little; pequeño ~ little, small, short).
    ${ }^{57}$ Informants, however, were not given any clue about the word class they were expected to use.

[^35]:    ${ }^{58}$ Cf. Footnote 28

[^36]:    ${ }^{59}$ See Laso, N. J. \& Verdaguer, I. 2005. "An invitation to explore conclusions and its restricted collocations", Specific, 2: 47-54.

[^37]:    ${ }^{60}$ The main features of their syntactic environment were identified with the assistance of the concordancing program WordSmith Tools (cf. chapter 3, section 3.2 for further reference on this programme.)
    ${ }^{1}$ These sequences have been referred to with different labels such as "speech formulas" (Pawley 1985), "multiword units" (Cowie 1988), "prefabricated routines" (Cowie 1988), "collocations" (Sinclair 1991), "formulae" (Moon 1992) and lexical bundles (Biber et al. 1999; Cortes 2002), among others (cf. chapter 2).

[^38]:    62 "(...) linguistic forms 'fade or grow pale' (verblassen), their colors 'bleach' (verbleichen), and must be covered with fresh paint'. In Hopper \& Traugott (1993:20)
    ${ }^{63}$ See Aitchison \& Lewis (2003:254).
    ${ }^{64}$ The term semantic bleaching was coined by the German neogrammarian Georg von der Gabelentz in 1891 (cf. References). Some other linguists (Sweetser 1988; Aitchinson and Lewis 2003) refer to that concept when discussing polysemy and grammaticalisation.

[^39]:    ${ }^{65}$ Cf. Footnote 62

[^40]:    ${ }^{66}$ The asterisked examples have not been taken from the HSC.
    67 "We support the conclusion that relatively small but vital changes in experimental protocols play a key role in underpinning the recent successes." (HSC example)

[^41]:    ${ }^{68}$ Cf. Biber et al. 1999 and Cortes 2002.

[^42]:    ${ }^{69}$ Following Biber et al.'s classification of adjectives (1999).

[^43]:    ${ }_{71}^{70}$ See classification in Howarth (1996).
    ${ }^{71}$ Notice that this syntactic function of Oblique is only applicable to the to-PP in the pattern lead to an agreement.
    ${ }^{72}$ Cf. Footnote 64

[^44]:    ${ }^{73}$ reach ( 3 occurrences in the passive as opposed to 1 in the active) and find (2 occurrences in the passive as opposed to 1 in the active).
    ${ }^{74}$ Here we will only refer to the periphrastic use of "be in agreement". "Be (an) agreement" will be analysed later on in combination with a fixed expression introduced by the existential "there".

[^45]:    ${ }^{75}$ Odd examples (i.e. 5, 7, 9, 11, 13 and 15) have been taken from the HSC, whereas even examples (i.e. $6,8,10,12,14,16)$ have been created ad hoc so as to illustrate whether the verb agree and its periphrastic counterpart, be in agreement, are semantically interchangeable or not.

[^46]:    ${ }^{76}$ Cf. Footnote 69

[^47]:    ${ }^{77}$ Odd examples (i.e. 53 and 55) have been taken from the HSC, whereas even examples (i.e. 54 and 56) have been created ad hoc so as to illustrate the fact that the on-PP postmodifying the noun agreement can be substituted by a that-clause.

[^48]:    ${ }^{78}$ Cf. Footnote 28 (p.48)

[^49]:    ${ }^{79}$ And /or from descriptions referring explicitly to them.

[^50]:    ${ }^{80}$ Examples 1a, 2a, 3a, 4a and 5 a have been taken from the HSC, whereas their counterpart ("b") examples have been produced ad hoc so as to compare the periphrastic structures (i.e. V + contribution) against the lexical verb contribute.

[^51]:    ${ }^{81}$ http://wordnet.princeton.edu/perl/webwn

[^52]:    ${ }^{82}$ Notice that coloured noun phrases appear as Prepositional complements of more than one of these prepositions.

[^53]:    ${ }^{83}$ The asterisked examples on the right column are considered to be ungrammatical utterances.

[^54]:    ${ }^{84}$ Notice that only two predicative adjectives have been found (difficult and non-medical), which brings us to conclude that decision is much more commonly modified by attributive adjectives.

[^55]:    85 *The asterisked adjectives indicate that they have been used more than twice within this pattern.

[^56]:    ${ }^{86}$ The only exception to this preference can be found in make a contribution, which tends to be used in the active voice (cf. section 4.6).

[^57]:    ${ }^{87}$ Verbleichen and verblassen, respectively, in Gabelentz's words (1891:242)

[^58]:    ${ }^{88}$ The first part (i.e. Survey Profile Questions) provides information about the informants' profile, which is described in chapter 3.

[^59]:    ${ }^{89}$ Cf. Appendix 4.
    ${ }^{90}$ The whole exercise is displayed in Appendix 4.

[^60]:    ${ }^{91}$ There were 28 occurrences of the combination make + comparison as opposed to 3 instances of do + comparison (cf. section 4.5).

[^61]:    ${ }^{92} 39,4 \%$ of the total number of occurrences of the pattern restricted verb + conclusion occurred with the verb draw. See further details in section 4.3.
    ${ }_{93}$ There was one informant who did not answer this item.

[^62]:    ${ }^{94}$ This informant provided the Spanish word form hacen rather than the English make.

[^63]:    ${ }^{95}$ This non-existent form may be referred to the verb suggest ("proponer" in Spanish).

[^64]:    ${ }^{96}$ The actual example provided was in Spanish: "* modificar" contributions.
    ${ }^{97}$ But for "such a conclusion is wrong", which was found once in the BoE (Bank of English), the other two adjectives provided by informants (i.e. contradictory and valid) were not found in the reference corpora.

[^65]:    ${ }^{98}$ Two of those informants, though, produced an ungrammatical form (i.e. *determinate) to refer to the verb determine.

[^66]:    ${ }^{99} \mathrm{Cf}$. sections 4.4 for the analysis of the combinations in agreement with and there is (adjective) agreement that and section 4.5 for the description of in comparison with/to.

[^67]:    ${ }^{100}$ Cf. Appendix 4
    ${ }^{101}$ The examples displayed in the analysis of Exercise 3 are the actual examples provided by informants, which means such deviations (e.g. spelling mistakes, inappropriate word forms) have been preserved.

[^68]:    ${ }^{102}$ Three informants provided no translation in Sentence 1.

[^69]:    ${ }^{103}$ This informant was unable to produce neither a suitable passive participle nor an equivalent of the Spanish adjective unánime and left both spaces blank.

[^70]:    ${ }^{104}$ The BoE includes only one occurrence of the predicative adjective unanimous being referred to the noun agreement: "the Saudi minister said, adding that the agreement was unanimous" [guard/uk].)

[^71]:    ${ }^{105}$ As the native corpora show, the adjective unanimous was not used predicatively in combination with the noun agreement, which indicates that the informant lacks knowledge of the collocational patterning of the noun under study. However, the structure subject + verb + complements (SVC) seems to be another strategy used to deal with the problem posed by the reflexive pronoun "se" in the Spanish sentence.

[^72]:    ${ }^{106}$ Following Huddleston's \& Pullum's (2005) terminology.

[^73]:    ${ }^{107}$ Unlike the rest of the examples in this list, the adjective large and its morphologically related adverb, i.e. largely, could only be found in the $B N C$ in combination with either the noun contribution or the verb contribute.

[^74]:    ${ }^{108}$ Misspelling of the adjective verifiable.

[^75]:    ${ }^{109}$ Notice that morphological problems with the word form verified were also present in this example.

[^76]:    ${ }^{110}$ The translations provided by the other two participants were completely free and included some information (underlined in the following examples) which was not explicit in the original: "transfussions follow strict protocols accordingly to some organizations" and "blood transfusion security is surveyed by some organizations".

[^77]:    ${ }^{111}$ In the HSC there were only 6 instances of this noun postmodified by a prepositional phrase [about / on]

[^78]:    ${ }^{112}$ See Appendix 4.

[^79]:    ${ }^{113}$ Notice informants were required to produce adjective-noun collocations in isolation and not as part of a given context.

[^80]:    ${ }^{114}$ The asterisked adjectives were chosen at random and did not occur as collocates of any of the abstract nouns considered.
    ${ }^{115} \mathrm{Cf}$. section 2.3 for further discussion on this "statistical / textual approach" to the notion of collocation.

[^81]:    ${ }^{116}$ The following list shows those adjective-noun combinations that were not produced by any of the informants: statistical/contradictory agreement; firm/substantial comparison; large/fashionable conclusion; fashionable contribution; substantial/small/large/little reliable/statistical decision.

[^82]:    ${ }^{117}$ The figures in brackets inform about the number of occurrences.

[^83]:    ${ }^{118}$ The figures in brackets indicate the number of informants who identified that collocation.

[^84]:    ${ }^{119}$ The asterisked adjectives did not occur neither in the BNC nor in the HSC as collocates of any of the abstract nouns considered.

[^85]:    ${ }^{120}$ Cf. Appendix 4.

[^86]:    ${ }^{121}$ As already pointed out at the beginning of this section, the word combinations in Group C were compared against the collocations found in the BNC since the fourteen nouns in this group were not traced in the HSC in combination with any of the six verbs analysed in this exercise.

[^87]:    ${ }^{122}$ Informants' verb-noun collocations in Exercise 4 can be seen in Appendix 7 (cf. Figures 67-72).

[^88]:    ${ }^{123}$ In Dörnyei's terminology (Dörnyei 2007:106)

[^89]:    ${ }^{124}$ cf. Survey Content-Based Question 8 in Appendix 8.

[^90]:    ${ }^{125}$ Informants' responses to this question can be seen in Appendix 8 (cf. Figures 73-77).

[^91]:    ${ }^{126}$ Human Immune Deficiency Virus (HIV) vs. Virus de Inmunodeficiencia Humana (VIH).
    ${ }^{127}$ Deoxyribonucleic Acid (DNA) vs. Ácido desoxirribonucleico (ADN).
    ${ }^{128}$ Major Histocompatibility Complex (MHC) vs. Complejo Mayor de Histocompatibilidad (CMH).

[^92]:    ${ }^{129}$ Notice this was already mentioned in the Survey Profile Questions (cf. section 3.4, Question 4), where informants were asked whether they had taken any course related to their speciality in English.

[^93]:    ${ }^{130}$ Cf. Survey Content-Based Questions in section 5.3.

[^94]:    ${ }^{131}$ Cf. Footnote 64

[^95]:    ${ }^{132}$ Notice their resemblance to the Spanish sequence "se produjo un acuerdo" (cf. section 5.1.2).

[^96]:    ${ }^{133}$ Although the present research was aimed at exploring the use of abstract nouns, this assertion has also proven to be true for other general vocabulary items characteristic of medical discourse, as Exercise 4 has shown (cf. section 5.1.4).

[^97]:    ${ }^{134}$ square brackets added.

[^98]:    "Language does not seem to operate on the basis of syntactic slots available for filling with minimal structural

[^99]:    ${ }^{135}$ For further discussion on teaching methodologies and materials that give account of phraseology, the interested reader can see, foe example, Conrad 1999/2000; Scott \& Tribble 2006; Laso \& Giménez 2007/2008 and Walker 2008.

[^100]:    ${ }^{136}$ See reference in Footnote 25 (cf. chapter 3).

[^101]:    ${ }^{137}$ Cf. References

[^102]:    Notice only twenty-three informants answered this question. HN8 provided no information about the time spent completing the questionnaires. Thus, hers was not taken into account in this Figure.

[^103]:    ${ }^{1}$ former title

[^104]:    1 The asterisked combinations in Figures 67-72 correspond to deviant collocations produced by informants.

