The presence of cognitive verbs in mathematical texts (1800–1900) of the *Coruña Corpus*[1]

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1 Introduction

Advances in research technologies have provided us with some interesting new tools for scholarship within the field of linguistics. Electronic corpora such as the *Helsinki Corpus of English Texts* and more recent collections, notably the *Corpus of Early English Correspondence*, the *Corpus of Early English Medical Writing* and the *Lampeter Corpus of Early Modern English Tracts*, are one example of this. The availability of texts through these corpora has enabled linguists not only to save a substantial amount of time but also to carry out more complete and conclusive studies in linguistics. The present study demonstrates, once again, the usefulness of such corpora. The corpus selected is a group of mathematical texts written in the 19th century and collected in the "*The Coruña Corpus: A Collection of Samples for the Historical Study of English Scientific Writing*", a project currently being carried out at the University of A Coruña (Moskowich and Crespo 2007).

From the emergence of empiricism onwards, the methods used in the analysis of reality changed as well as the way in which knowledge was presented and transmitted. This corpus-based study examines a selection of scientific texts, focusing on the type of verbs used in order to show which types were preferred in scientific expository texts. This exploration of the verbs used in mathematical discourse over a period of a hundred years may in turn tell us more about the development of scientific writing in general in the English language. The analysis will take into account four different semantic classes of verbs: verbs of communication, verbs of desire, aspectual verbs and verbs of perception.

The first part of the study deals with the semantic classification of English verbs, especially in respect of the description offered by Noonan (1985) and Levin (1993). In the second part, following a short review of the development of Mathematics in the 19th century, the texts selected will be analysed in terms of the classifications provided in both.

2 Corpus material

As mentioned above, the present study uses texts provided by the research team currently working on the *Coruña Corpus*. Our intention in that project is to select a wide range of scientific texts, with the exception of medical ones, from 1650 (the beginning of empiricism) to 1930 (pre-Second World War). The compilation process is at an initial stage, however, and the research group is still working on texts related to Mathematics and Astronomy. This paper is proposed as a preliminary study, designed to aid subsequent research on scientific writing and as an indication of the type of study for which this material may prove useful.

Some of the criteria taken into account in the selection of texts for the Coruña Corpus should be mentioned here: two books selected per decade (one from the first part of the decade, the other from the later); samples chosen taken from first editions, where available, and taking into account the principle of representativity;[2] text size of samples: 10,000 words per book. The corpus selected for the present study comprises nineteen mathematical texts from the 19th century. Table 1 contains a list showing the dates, titles and authors of the books of those nineteen samples:

Table 1: Dates, titles and authors of the texts analysed

MATHEMATICAL TEXTS (19th century)		
DATE	**TITLE**	**AUTHOR**
1803	*The Principles of Analytical Calculation*	Robert Woodhouse
1811	*An Elementary Investigation of the Theory of Numbers, with its Application to the Indeterminate and Diophantine Analysis, the Analytical and Geometrical Division of the Circle, and Several other Curious Algebraical and Arithmetical Problems*	Peter Barlow
1815	*A Treatise of Plane Trigonometry. To which is Prefixed, a Summary View of the Nature and Use of Logarithms. Being the Second Part of a Course of Mathematics, Adapted to the Method of Instruction in the American Colleges*	Jeremiah Day
1824	*An Elementary Treatise on Conic Sections, Spherical Geometry, and Spherical Trigonometry*	Matthew R. Dutton
1828	*Application of the Preceding Results to the Theory of Electricity*	George Green

1831	*A Treatise on Algebraic Geometry*	The Rev. Dionysius Lardner
1836	*On the Study and Difficulties of Mathematics*	Augustus De Morgan
1842	*An Elementary Treatise on the Differential Calculus, in which the Method of Limits Exclusively Made Use of*	The Rev. M. O'Brien
1849	*An Introduction to the Differential and Integral Calculus: With an Appendix, Illustrative of the Theory of Curves and Other Subjects*	James Thomson
1850	*An Elementary Treatise on the Calculus of Variations*	The Rev. John Hewitt Jellett
1855	*A Treatise on Trigonometry*	George Biddell Airy
1863	*Chapters on the Modern Geometry of the Point, Line, and Circle; Being the Substance of Lectures Delivered in the University of Dublin to the Candidates for Honours of the First Year in Arts*	The Rev. Richard Townsend
1866	*Trilinear Coordinates and other Methods of Modern Analytical Geometry of two Dimensions: An Elementary Treatise*	The Rev. William Allen
1872	*The Geometry of Conics*	Charles Taylor
1876	*Elementary Arithmetic, with Brief Notices of its History*	Robert Potts
1881	*The Theory of Equations: With an Introduction to the Theory of Binary Algebraic Forms*	William Snow Burnside and Arthur William Panton
1889	*A Treatise on Spherical Trigonometry, and its Application to Geodesy and Astronomy, with Numerous Examples*	John Casey
1893	*An Elementary Treatise on Fourier's Series and Spherical, Cylindrical, and Ellipsoidal Harmonics with Applications to Problems in Mathematical Physics*	William Elwood Byerly
1897	*A Brief Introduction to the Infinitesimal Calculus. Designed Especially to Aid in Reading Mathematical Economics and Statistics*	Irving Fisher

3 The situation of Mathematics in the 19th century

That Mathematics today is a consolidated science is beyond all dispute. But what was its situation when the texts surveyed here were written? In terms of periodisation, it is clear that standardised chronological divisions do not offer a completely accurate picture of the developments that took place in the history of science. Some of the most significant changes actually happened, or at least

began, several years earlier and ended some time later than is generally accepted, as was the case with Mathematics. In that respect, the year 1800 does not represent an absolute turning point in the history of the discipline.

However, it was in the 19th century that all the different branches of Mathematics were to undergo an important qualitative development, as well as a remarkable transformation in content. Carl Friedrich Gauss (1777–1855) and Augustin Louis Cauchy (1789–1857) were two of the mathematicians who contributed to this developmental burst within the science, changing its course with their theories and thoughts and creating a style that would be followed throughout the rest of the century.

At the time, France, Germany and Great Britain were the greatest mathematical authorities in the modern world, though Russia and Italy also made their contribution to the science, albeit to a lesser degree. After 1850 Germany became the most important centre of mathematical development as a result of the influence of the new University of Berlin, "al permitir la libertad de explicación de las investigaciones de los propios profesores" (Hormigón Blánquez 1991: 52). A final overview of the century reveals the continuous publication of mathematical periodicals, newspapers, journals and reviews during the first half of the century, and in the second half, the creation of new mathematical organisations, among them the London Mathematical Society (1865), the Société Mathématique de France (1872), the American Mathematical Society (1888) and the Deutsche Mathematische Vereinigung (1890) (Hormigón Blánquez 1991: 52). By the end of the 19th century, the science of Mathematics had been firmly consolidated, as the First International Congress of Mathematicians in Zurich in 1897 shows. This first meeting marked a significant moment in the history of the science, after which (from 1900 onwards) mathematicians began to celebrate meetings every four years.

This evolution of Mathematics was also accompanied by changes in its written expression. From a historical perspective, a comparison of mathematical texts written in English shows how this register evolved. By analysing the language used, it is possible to identify and even to trace the different ways in which knowledge was transmitted, depending on the prevailing philosophy of science at any given time (Taavitsainen and Pahta 1997). The differences, for instance, between Chaucer's *Treatise on the Astrolabe* (1391), with his proto-scientific language, and the writings of Newton, Priestley and Dalton (Opticks, published in 1704, *The History and Present State of Electricity, with Original Experiments* in the 1760s and *A New System of Chemical Philosophy* in 1827, respectively) are clear and illustrate the evolution of a scientific language in which men of science were attempting to improve the exactness of scientific

terms in order to fulfil their need to represent reality. In other words, this new way of expressing scientific research marks the birth of scientific English (Halliday 1993), a new discourse characterised mainly by its nominal and verbal features.[3]

The new organisation of knowledge undertaken at the end of the 18th century centred on nominalisation and the performance of a verbal group which "signals that the process takes place; or, more substantively, sets up the logical relationship of one process to another (...)" (Halliday 1993: 64), and resulted in the creation of a new model for scientific writing. The next section offers a study focusing on the verbal group and analyses the type of verb used to transmit mathematical knowledge at a time when the register had already become established.

4 Semantic classifications of verbs

All developments within the discipline were reflected in writing, as the use of a technical specialised language in the samples analysed in this study illustrates.[4] With this respect and considering the evolution of specialised languages (as it is the case of scientific and technical languages), I have decided to concentrate on the analysis of English verbs in the mathematical discourse and their semantic classification.

It is known that specialised languages follow the grammatical rules of the general language in which they are immersed but differ from that common language in (among other aspects) their use of a specialised terminology and the application of words in different semantic contexts.[5] It is also known that semantic classifications group words according to their similarities of meaning, and considering verbs, I have seen that the semantic classification of English verbs is particularly interesting as "knowledge about verbs is especially important, since verbs are the primary means of structuring and conveying meaning in a sentence" (Esteve-Ferrer 2004: 1). Some linguists (Pinker 1989, Jackendoff 1990, Fellbaum 1999, Crystal 2003) have presented different semantic classifications for English verbs (only a few examples in some cases or restricted to certain class types in others). In 1993 Beth Levin established the largest and most widely classification, "guided by the assumption that the behaviour of a verb, particularly with respect to the expression and interpretation of its arguments, is to a large extent determined by its meaning" (1993: 1).[6]

In this study, I consider Levin's classification in conjunction with the extended lexical-semantic classification of English verbs presented some time later by Anna Korhonen and Ted Briscoe (2004).[7] Another classification has

also been taken into account: Noonan's (1985) study about complementation, which discusses the characteristics of complement types and the semantic classes of complement-taking predicates, has a certain relevance for the purposes of this paper.

The most notable difference between both points of view is the attention paid by Noonan to the question of syntax. His classes (1985: 110) do not take into account the full semantic properties of verbs and he classifies them according to the choice of complement type in each case. By contrast, although Levin is also interested in syntax, she takes it into consideration at a different level. For instance, acknowledging the relationship between the meaning of a verb and its syntactic behaviour, she accepts that semantic information may be inferred from the syntactic behaviour of the verb (Levin 1993: 11). Bearing in mind both perspectives, this study analyses the frequency of use of four semantic classes of English verbs and their occurrence in 19th-century mathematical texts (those adopted by both Noonan and Levin in their studies): verbs of communication, verbs of desire, aspectual verbs and verbs of perception.

5 Research tools and material

The data investigated have been extracted from the 19 mathematical texts (written during the 19th century) chosen from the *Coruña Corpus*, mentioned above in section 2. The programmes used to record the frequency of occurrences of the English verbs studied in this mathematical corpus are TACT and Access, thanks to both of which it was possible to select all the verbs present in the texts and to create a database of the results obtained.

As already pointed out, Noonan (1985) classifies English verbs from a semantic perspective according to the choice of complement-taking predicates. Using that approach, he establishes 14 different groups on the basis of 14 different predicates: utterance predicates, propositional attitude predicates, pretence predicates, commentative predicates, predicates of knowledge and acquisition of knowledge, predicates of fearing, desiderative predicates, manipulative predicates, modal predicates, achievement predicates, phrasal predicates, immediate perception predicates, negative predicates and conjunctive predicates. Beth Levin's study, in turn, comprises two main parts: a list of eight diathesis alternations and a list of 48 main verb classes.[8]

6 Criteria for the selection of the semantic classes and analysis of data

Among the wide variety of semantic categories, both Noonan (1985) and Levin (1993) include the same verbs and the same labels in four of their classes. This correspondence led me to select those four and to study their frequency of occurrence in our corpus of mathematical texts.

The focus of Noonan's study does not lie in analysing the full semantic properties of each separate verb in the language, and it is probably that attitude which justifies his inclusion of a small number of verbs within each class. Levin provides a wider classification, as already mentioned, using different labels. The methodology adopted for the elaboration of this investigation is based on Levin's assumption (1993: 14) that the syntactic behaviour of verbs is determined semantically.

In spite of using a different verb classification, both authors assume the same attitude in relation to the classes of verbs presented in Table 2:

Table 2: Noonan's and Levin's classes of verbs

Noonan		**Levin**	
Class 1	Utterance predicates	Verbs of communication	Class 37
Class 7	Desiderative predicates	Verbs of desire	Class 32
Class 11	Phrasal predicates (aspectuals)	Aspectual verbs	Class 55
Class 12	Immediate perception predicates	Verbs of perception	Class 30

Each of these classes will be dealt with separately in the sections that follow.

6.1 Utterance predicates or verbs of communication

Noonan includes *say*, *tell*, *report* and *ask* as the English verbs that describe a transfer of information, namely, utterance predicates (1985: 110). Levin, for her part, provides a different label (*Verbs of Communication*) and includes additional items which I have also considered for this study. Notwithstanding, three subcategories of these verbs, *Verbs of Instrument of Communication* (e.g. *e-mail*, *fax*, *netmail*, etc...), *Verbs of Manner of Speaking* and *Chitchat Verbs*, do not occur in our corpus owing to the nature of the texts and their dates of composition.

Table 3 shows the list of verbs that Levin includes in her classification of verbs of communication together with those found in our corpus:

Table 3: Verbs of communication

VERBS OF COMMUNICATION (Levin 1993)		
Subcategories	**Class Members**	**Verbs in the Corpus**
Verbs of Transfer of a Message	*ask, cite, demonstrate, dictate, explain, explicate, narrate, pose, preach, quote, read, relay, show, teach, tell, write*	*ask, demonstrate, explain, read, show, tell, write*
Tell	*tell (only)*	*tell*
Talk Verbs	*speak, talk*	_____
Say Verbs	*announce, articulate, blab, blurt, claim, confess, confide, convey, declare, mention, note, observe, pro-claim, propose, recount, reiterate, relate, remark, repeat, report, reveal, say, state, suggest*	*announce, declare, mention, note, observe, propose, repeat*
Complain Verbs	*boast, brag, complain, crab, gripe, grouch, grouse, grumble, ketch, object*	_____
Advise Verbs	*admonish, advise, alert, caution, counsel, instruct, warn*	_____

Table 4 shows the number of occurrences of these verbs in the corpus and the forms they take:

Table 4: Occurrence of verbs of communication in the corpus

VERBS IN THE CORPUS				
Verbs of Communication	**Verb Forms**			
	Present	**Past**	**Present Participle**	**Past Participle**
Ask	4	0	0	0
Demonstrate	5	0	0	12
Explain	19	20	3	0
Read	12	0	0	0
Show	18	0	10	36

Tell	8	1	0	0
Write	34	0	20	69
Announce	4	2	1	0
Declare	1	0	0	0
Mention	2	0	0	13
Note	2	2	0	0
Observe	23	0	9	32
Propose	2	0	0	22
Repeat	4	0	2	10
TOTAL	**139**	**25**	**35**	**194**

6.2 Desiderative predicates or verbs of desire

The verbs grouped as *desiderative predicates* or *verbs of desire* are semantically classified into three usage categories by Noonan (1985: 121): *hope*-verbs, *wish*-verbs and *want*-verbs. Levin presents only two classes: *want*-class and *long* verbs. For this classification, Levin (1993: 194) takes into account the expression of the second argument (i.e. the thing desired), depending on whether they are transitive (*want* verbs) or intransitive (*long* verbs).

Table 5 shows the verbs in this class while Table 6 contains the number of occurrences and the forms as they appear in the texts under survey:

Table 5: Verbs of desire

VERBS OF DESIRE (Levin 1993)		
Subcategories	**Class Members**	**Verbs in the Corpus**
Want Verbs	*covet, crave, desire, fancy, need, want*	*want*
Long Verbs	*After: dangle, hanker, lust, thirst, yearn* *For: ache, crave, fall, hanker, hope, hunger, itch, long, lust, pine, pray, thirst, wish, yearn*	*fall*

Table 6: Verbs of desire in the corpus

VERBS IN THE CORPUS				
Verbs	**Verb Forms**			
	Present	**Past**	**Present Participle**	**Past Participle**
Want	8	2	0	0
Fall	8	0	16	12
TOTAL	**16**	**2**	**16**	**12**

6.3 Phasal predicates (aspectuals) or aspectual verbs

Noonan defends the use of the term *phasal predicates*, making a direct reference to Newmeyer (1975) for the term 'aspectual' and to Longacre (1976) for the term 'phasal'. Therefore, when he talks about *phasal predicates* he refers "to the phase of an act or state: its perception, continuation, or termination" (1985: 129). Levin's definition (1993: 274) is quite similar as she states that "these verbs describe the initiation, termination, or continuation of an activity", though she does not discuss their sentential complement-taking properties. Tables 7 and 8 show the items identified as *aspectual verbs* and their frequency in the corpus:

Table 7: Aspectual verbs

ASPECTUAL VERBS (Levin)		
Subcategories	**Class Members**	**Verbs in the Corpus**
Begin Verbs	*begin, cease, commence, continue, end, finish, halt, keep, proceed, repeat, resume, start, stop, terminate*	*begin, commence, continue, finish, keep, proceed, repeat, resume, start*
Complete Verbs	*complete, discontinue, initiate, quit*	*complete*

Table 8: Aspectual verbs in the corpus

VERBS IN THE CORPUS				
Aspectual Verbs	**Verb Forms**			
	Present	**Past**	**Present Participle**	**Past Participle**
Begin	12	3	11	1
Commence	7	1	5	0
Continue	5	37	0	0
Finish	4	2	0	0
Keep	3	3	3	0
Proceed	54	0	0	0
Repeat	4	0	2	10
Resume	1	0	0	0
Start	5	0	3	0
Complete	0	0	4	1
TOTAL	**95**	**46**	**28**	**12**

6.4 Immediate perception predicates or verbs of perception

Noonan includes within this group those verbs whose predicates "name the sensory mode by which the subject directly perceives the event coded in the complement" (1985: 129–130). Levin, in turn, considers four groups (*see* verbs, *sight* verbs, *peer* verbs and stimulus subject perception verbs) and she differs from Noonan in her analysis of the verb *imagine*. Levin includes this verb within the group of *appoint* verbs in her verb class 29, *Verbs with Predicative Complements*, though she admits that this classification in particular needs to be refined (1993: 181). Owing to this lack of agreement, the verb *imagine* has been omitted from my analysis and is, consequently, absent from Table 10. Tables 9 and 10 show the items identified as *verbs of perception* and their frequency in the corpus:

Table 9: Verbs of perception

VERBS OF PERCEPTION		
Subcategories	**Class Members**	**Verbs in the Corpus**
See Verbs	*detect, discern, feel, hear, notice, see, sense, smell, taste*	*detect, feel, see*
Sight Verbs	*descry, discover, espy, examine, eye, glimpse, inspect, investigate, note, observe, overhear, perceive, recognise, regard, savor, scan, scent, scrutinise, sight, spot, spy, study, survey, view, watch, witness*	*discover, examine, investigate, note, observe, perceive, recognised, regard, survey*
Peer Verbs	*check (on), gape, gawk, gaze, glance, goggle, leer, listen (to), look, ogle, peek, peep, peer, sniff, snoop (on), squint, stare*	*check, look*
Stimulus Subject Perception Verbs	*feel, look, smell, sound, taste*	*feel*

Table 10: Verbs of perception in the corpus

VERBS IN THE CORPUS				
Verbs of Perception	**Verb Forms**			
	Present	**Past**	**Present Participle**	**Past Participle**
Detect	2	0	1	0
Feel	5	2	0	0
See	83	1	5	65
Discover	5	0	2	11
Examine	6	1	2	0
Investigate	8	0	4	8
Note	2	2	0	0
Observe	23	0	9	32
Perceive	5	0	0	0

Recognised	0	0	0	1
Regard	5	0	7	1
Survey	0	0	1	0
Check	0	0	0	2
Look	9	2	1	0
Feel	5	2	0	0
TOTAL	**158**	**10**	**32**	**120**

7 Analysis of findings and final remarks

The results obtained in this study show that the verb class *verbs of communication* is the most frequent of the four classes analysed with 393 verbal forms in the corpus. By contrast, v*erbs of desire* constitute the least numerous class with only 46 verb forms. *Aspectual verbs* have a higher representation, with 181 verb forms, and the final verb class, *verbs of perception*, is the most numerous beside the first, with 320 verb forms.

The data suggest that the tendency to use more verbs of communication and perception in comparison with the other two verb classes bears a direct relation to the type of texts analysed here. That result is consistent with the increasing tendency since Middle English to aim in scientific texts for a greater degree of clarity, accuracy, conciseness, informativeness and directness (Pérez Iglesias 2003: 180). The two predominant verb classes here would certainly help to achieve such an objective.

Secondly, the examination of the verb forms identified reveals the low occurrence of some verb tenses, as in the case of the simple past (113 verb forms) and the present participle (111 verb forms). By contrast, verb forms in the simple present (349) and the past participle (338, most of them in passive constructions) may all be seen as evidence of the evolution of scientific language. The predominance of passive constructions and the simple present to describe processes and state general truths leads to the conclusion that there is a clear tendency towards depersonalisation in this type of language. Moreover, the use of such verb forms and the passive confirms how scientific discourse concentrates on the exposition of knowledge rather than on its audience.

Thirdly, according to Ghadessy (1988) the most productive model for scientific writing by the end of the 18th century was that of nominalisation. This means that there was an increase in the presence of nouns in relation to verbs. In

this context "the verbal group signals that the process takes place; or, more substantively, sets up the logical relationship of one process to another, either externally (a causes x), or internally (b proves y)" (Ghadessy 1988: 173). The texts surveyed in this study contain a large number of verbs expressing both external and internal relations, principally through verbs of perception and communication.

Finally, although it is true that scientific discourse has become depersonalised, the evidence of these verbs confirms Ghadessy's words (1988: 174) when he says that, "(...) in their more relational functions (including personal projections as in our results show that...) these verbs play a central part in the syndrome of scientific English, constructing the internal steps in the argument whereby a process is paired with one that is evidence for it rather than one that is its cause".

By way of conclusion and in view of the data obtained, this admittedly very preliminary overview of verbs in 19th-century mathematical texts would seem to confirm a tendency in scientific writing to reveal and communicate facts in a direct manner. The texts studied show the presence of an objective language (predominance of verbs of communication and verbs of perception *versus* aspectual verbs and verbs of desire) and the adoption of an impersonal tone (the presence of passive verb forms), two of the main features which have characterised this type of discourse in its search for conciseness and clarity since the 17th century. The results of the survey show, therefore, that these two characteristics of the scientific register today were already well-established by the 19th century.

Notes

1. The research reported on here has been funded by the Xunta de Galicia through its Dirección Xeral de Investigación e Desenvolvemento, grant number PGIDIT03PXIB10402PR (supervised by Isabel Moskowich) and by the Universidade da Coruña through its Vicerreitoría de Investigación (supervised by Begoña Crespo). These grants are hereby gratefully acknowledged.
2. According to Moskowich and Crespo (2004), this decision has been taken in view of Kytö, Rudanko and Smitterberg's claim (2000: 92) that short-term change in diachrony can be safely studied over periods of thirty years. On the other hand, the selection of more than one text by the same author has been avoided in order to avoid author's idiosyncrasies, following some of the compilation principles of the *LAMPETER Corpus of Early Modern English Tracts*.

3. Halliday (1993: 64) summarises technical English features in terms of nominal elements, comprising technical taxonomies and summary and package representations of processes, and verbal elements, which present and show the relationship between nominalised processes.
4. The special features of mathematical texts in English were presented in a workshop during the Second International Conference on the English Language in the Late Modern Period 1700–1900 (LMEC2) held at the University of Vigo.
5. According to Pérez Iglesias (2003: 176), "In scientific English an ordinary word must modify its semantic range of application to become specialized. Its use may also be generalized, transferred or figurative and metaphorical, or it may become a word with several meanings, a synonym or an antonym". In fact, in some cases, technical words tend to restrict their meaning as a direct consequence of specialisation.
6. Levin (1993) classifies 3,024 verbs and 4,186 senses into 240 classes.
7. They add 57 new classes for verbs not covered by Levin (1993) and they add 106 diathesis alternations.
8. Part one considers alternations: transitivity alternations, alternations involving arguments within the VP, "oblique" subject alternations, reflexive diathesis alternations, passive, alternations involving post-verbal "subjects" and other constructions and verbs requiring special diathesis. The second part consists of the list of verb classes: verbs of putting, verbs of removing, verbs of sending and carrying, verbs of exerting force, verbs of change of possession, *learn* verbs, *hold* and *keep* verbs, verbs of throwing, verbs of contact by impact, *poke* verbs, verbs of contact, verbs of combining and attaching, verbs of separating, and disassembling, verbs of colouring, image creation verbs, verbs of creation and transformation, *engender* verbs, *calve* verbs, verbs with predicative complements, verbs of perception, psych-verbs, verbs of desire, judgements verbs, verbs of assessment, verbs of searching, verbs of social interaction, communication, sounds made by animals, involving the body, verbs of grooming and bodily care, verbs of killing, verbs of emission, *lodge* verbs, verbs of existence, verbs of appearance, disappearance and occurrence, verbs of body-internal motion, verbs of assuming a position, verbs of motion, *avoid* verbs, verbs of lingering and rushing, measure verbs, aspectual verbs, *weekend* verbs and weather verbs.

References

Crystal, David. 2003. *English as a global language*. Cambridge: Cambridge University Press.

Esteve-Ferrer, Eva. 2004. Towards a semantic classification of Spanish verbs based on subcategorisation information. Available at acl.ldc.upenn.edu/acl2004/studentws/ps/ferrer.ps

Fellbaum, Christiane. 1999. The organization of verbs and verb concepts in a semantic net. In P. Saint-Dizier (ed.). *Predicative forms in natural language and in lexical knowledge bases*, 93–110. Netherlands: Kluber Academic Publishers.

Ghadessy, Mohsen. 1988. The language of physical science. In M. Ghadessy (ed.). *Registers of written English. Situational factors and linguistic features*, 161–178. London, NY: Pinter Publishers.

Görlach, Manfred. 1999. *English in 19th-century England: An introduction.* Cambridge: Cambridge University Press.

Halliday, M.A.K. and J.R. Martin. 1993. *Writing science. Literacy and discursive power.* Basingstoke: University of Pittsburgh Press.

Hormigón Blánquez, M. 1991. *Las matemáticas del siglo XIX*. Madrid: Akal, cop.

Jackendoff, R. 1990. *Semantic structures*. Cambridge, Mass.: MIT Press.

Korhonen, Anna. and Ted Briscoe. 2004. Extended lexical-semantic classification of English verbs. Available at http://cs.baylor.edu/~girju/hlt-naalc/pdf/korhonen.pdf

Kytö, Merja, Juhani Rudanko and Erik Smitterberg. 2000. Building a bridge between the present and the past: A corpus of 19th-century English. *ICAME Journal* 24: 85–97.

Levin, Beth. 1993. *English verb classes and alternations*. Chicago: University of Chicago Press.

Longacre, Robert E. 1976. *An anatomy of speech notions* (Publications in Tagmemics 3). Lisse (Netherlands): The Peter de Ridder Press.

Moskowich, Isabel and Begoña Crespo. 2004. Scientifically-marked style (1700–1900): Linguistic conventions and social implications. Workshop presented at the Second Late Modern International Conference (LMCE 2) held at Vigo (Spain), November 2004.

Moskowich, Isabel and Begoña Crespo. 2007. Presenting the Coruña Corpus: A collection of samples for the historical study of English scientific writing.

In J. Pérez-Guerra, D. González-Álvarez, J. L. Bueno Alonso and E. Rama Martínez (eds.). *'Of varying language and opposing creed': New insights into Late Modern English*, 341–357. Bern: Peter Lang.

Newmeyer, Frederick J. 1975. *English aspectual verbs*. The Hague: Mouton and Company.

Noonan, Michael. 1985. Complementation. In T. Shopen (ed.). *Language typology and syntactic description*. Vol. 2. *Complex constructions*, 42–140. Cambridge: Cambridge University Press.

Pérez Iglesias, Elvira. 2003. Semantic description of scientific English register. In M. Brito and P. Domínguez (eds). *Revista Canaria de Estudios Ingleses* 46 (April 2003): 173–182. La Laguna: Universidad de La Laguna.

Pinker, Steven. 1989. *Learnability and cognition: The acquisition of argument structure*. Cambridge, Mass.: MIT Press.

Taavitsainen, Irma and Päivi Pahta. 1997. Corpus of early English medical writing 1375–1750. *ICAME Journal* 21: 71–78.