

# 18<sup>th</sup> century scientific writing: A study of *make* complex predicates in the *Coruña Corpus*<sup>1</sup>

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## **Abstract**

*Complex predicates formed by the verb make plus a noun are suitable for being studied historically with very interesting results, as it was observed in previous literature. However, our interest lies in tracing, comparing and understanding what may be the variation of these constructions in scientific writing, and in their different chronological layers, analysing different scientific disciplines included in the Coruña Corpus of English Scientific Writing (CC hereafter). As this proves to be a long-term objective, the aim of this paper is to study the use of complex predicates in only one of these disciplines. To this end, some texts included in the 18<sup>th</sup> century Life Sciences discipline of the CC have been analysed. Linguistic and extralinguistic information has been taken into account. Finally, the use of complex predicates and related verbs made by the scientists in question has been compared.*

## **1 Introduction**

This paper presents our first approach to the study of some analytical structures formed by the verb *make* plus noun in some selected 18<sup>th</sup> century scientific texts taken from the *Coruña Corpus of English Scientific Writing (CC)*. Our final aim is to observe the use of these constructions made by scientists when they report or describe the result of their observations. However, since the *CC* is an ongoing project, only partial results based on the Life Sciences discipline can be presented in this study.

The paper has been divided into different sections devoted to the following points. Section 2 includes some comments on the corpus itself; section 3 deals with the construction *make* plus noun and its historical development and section 4 encompasses two subsections that show the results obtained after applying extralinguistic and linguistic criteria. Finally, section 5 has been devoted to the

comparison between the related verbs and complex predicates frequencies. We have followed the same structure and applied, more or less, the same methodology as in Lareo (forthcoming a) for the sake of a future comparison.

## 2 *The Coruña Corpus project*

The Research Group for Multidimensional Corpus-based Studies in English (*MuStE*), from A Coruña University is carrying out an ambitious project devoted to the compilation of a corpus of English scientific texts published between 1650 and 1900. This collection of samples for the historical study of scientific writing will not include medical writing given the fact that Profs. Irma Taavitsainen, Päivi Pahta and their team in Helsinki have already taken on this field,<sup>2</sup> publishing the *Middle English Medical Texts* corpus (Taavitsainen, Pahta and Mäkinen 2006). Therefore, the *CC* will aim to be a new tool for linguistic studies and an addition to the already existing corpora.

The *CC* will comprise different scientific fields taken from the 1978 UNESCO classification for Science and Technology. As shown in Appendix (Lareo forthcoming a), this classification uses different labels to group scientific disciplines. Given that the *CC* is a historical corpus, we have selected disciplines from all the fields except from the ones that do not have a historical scope or were already included in other corpora, such as number II, Engineering and Technology, number III, Medical Sciences, and number IV, Agricultural Sciences. Therefore, only texts dealing with topics embraced in number I, Natural Sciences, number V, Social Sciences, and number VI, Humanities, are included. The texts selected deal with Astronomy, Physics, Mathematics, History, Philosophy, Linguistics, Geography or Life Sciences, each subject being arranged in a different subcorpus within the *CC*.

As explained in Lareo (forthcoming a) and Moskowich and Crespo (2007), the compilation process follows theoretical and practical principles that make the inclusion of texts representing scientific writing from different periods possible. Thus, some texts dealing with Astrology or Alchemy were included because they were an important part of the 17<sup>th</sup> century scientific world. Other important decisions were made such as the number of disciplines encompassed, the number of texts and the number of words taken from each text. We aim at compiling a corpus of eight different disciplines, including two texts per decade. Only first editions of texts written in English by different English-speaking authors are included. That means we reject translations and texts written by non-native speakers. The number of words taken from each text was also discussed. The final decision was that each of the samples will contain around 10,000

analysable words. Thus, each discipline will total 500,000 running words, having the final corpus around 4,000,000 words.

This pilot study was based on the Life Sciences subcorpus. It comprises texts dealing with living organisms, namely, plants, animals or humans. One of the problems the team had to face while compiling this section of the *CC* was to choose the most appropriate label. Unexpectedly, this was the subject of endless controversy. The team's aim was to find a label for this *CC* discipline that encompasses categories such as, in modern terms, Biology, Entomology, Botany, Microbiology, Zoology, or descriptive animals' or humans' Anatomy. Since this subcorpus is obviously multidisciplinary, following the UNESCO classification (Appendix), we discussed different labels that might embrace the whole content. The most polemic ones were Biology, Natural History and Life Sciences.

The first option that was considered in its initial stages was *Biology*. However, this term posed a problem because its definition as “the science of physical life; the division of physical science which deals with organized beings or animals and plants, their morphology, physiology, origin and distribution” (*Oxford English dictionary, OED*) was not attested until 1819. Therefore, as the *CC* comprises also texts published before this date, the second label was discussed.

Natural History could have been the more suitable label for texts written before the 19<sup>th</sup> century; however, the same problem arose when we wanted to extend it to a long diachronic period. According to Shaw (1725), Natural History was not seriously taken under consideration by scientists. In fact, he writes in the preface of Boyle's philosophical works that it seemed “to lie under some disgrace, upon account of the small benefit that is presumed to arise from the study of it”. At the same time, this discipline, in its extent, is found by him to be a very large field. To refute this general opinion of uselessness, however, he includes in that volume Boyle's foundations of natural history writings. Boyle (1725: 5–14) presents a guide to write the natural history of a country, explaining the essence of writing a natural history. Boyle understands this type of writing as the minute description of every part or element of a topic. The natural history of a country, for instance, should include the description of the heavens, the air, the water (seas, rivers, currents, whirlpools) and the earth. The last topic will embrace reports on the soil and mountains, as well as on productions (trees, fruits, plants, minerals) and on inhabitants. The last ones should be fully described, i.e. their appearance, strength, diet, diseases, behaviour, etc.

Taking into account Boyle's explanations, then, this label does not seem to represent accurately this section of the *CC*. As mentioned above, this subcorpus comprises only texts dealing with living organisms (plants, animals, human

beings). Moreover, even when a natural history treatise was selected, only the section dealing with animals or plants was taken. Furthermore, although natural history was the main subject taught by college science professors, it was increasingly scorned by scientists of a more specialised manner and relegated to an amateur activity rather than a part of science proper. It is then that the discipline Biology as a scientific field appears. Nevertheless, Natural history texts have been selected as the representative predecessors of early scientific writing. Finally, as a wide variety of topics has been taken, the label Life Sciences, excluding medical sciences, has been weighed up as the more appropriate one.

### 3 *Make plus noun collocations*

Our interest in this type of collocation was awakened by the fact the verb *make* was attested in previous historical research studies as the most commonly used when functioning as a collocative or *light verb* (Jespersen 1954: 117). According to Akimoto and Brinton (1999: 30) and following the information included in the *OED*, the first appearance of *make* as collocative can be traced back till the 12<sup>th</sup> century. It is then that *make* acquires the meaning of the corresponding Latin *facere* and French *faire* when used with deverbal nouns or nouns of action. This role previously played by the OE verbs *gewyrcean* or *don* (*OED* 57a) was assumed in part by OE *gemacian* when it was incorporated into the English vocabulary. In fact, most of the Old English collocations in which *don* is involved have undergone a change of collocative verb in favour of *make* (see Lareo forthcoming a).

The results obtained in previous corpus-based historical research, namely those carried out by Matsumoto (1999) in Middle English, and Hiltunen (1999), Kytö (1999) and Claridge (2000) in Early Modern English (included and explained in Lareo forthcoming a) show a predominant usage of *make* in different corpora (Table 1). Taking into account that these results are based on three more general corpora and only one has a more specific nature, our aim is to check the use of *make* as a collocative with deverbal nouns in a specific discipline of the CC, namely, 18<sup>th</sup> century Life Sciences.

Table 1: Previous research results (Lareo forthcoming a)

Period	Middle English	Early Modern English		
Authors	Matsumoto	Kytö	Hiltunen	Claridge <sup>3</sup>
Dates	1100-1500	1500-1710	1580-1680	1640-1740
Corpus	ME and OE dictionaries, Malory, Chaucer	Helsinki Corpus	40 dramatic <sup>4</sup> works, 14 poems, 6 prose	Lampeter Corpus
Words		551,000	1,100,000	1,772,102
Tokens	1,950	2,056	1,851	1,579
Types	990	675	625	250
Verb classification by number of types	<i>Maken</i> <i>Taken</i> <i>Hauen</i> <i>Don</i> <i>yeven</i>	<i>Make</i> <i>Have</i> <i>Give</i> <i>Take</i> <i>Do</i>	<i>Make</i> <i>Have</i> <i>Give</i> <i>Take</i> <i>Do</i>	<i>Make</i> <i>Give</i> <i>Take</i> <i>Have</i> <i>Do</i>
Verb classification by number of tokens		<i>Make</i> <i>Have</i> <i>Give</i> <i>Take</i> <i>Do</i>	<i>Have</i> <i>Take</i> <i>Give</i> <i>Make</i> <i>Do</i>	<i>Make</i> <i>Take</i> <i>Give</i> <i>Have</i> <i>Do</i>

As the term collocation has been used to denote a wide variety of structures, we have decided to follow Cattell's theory (1984) to search only for one type of collocation. These collocations called *complex predicates* (CP hereafter) by Cattell (1984: 43), have an etymologically related verb that can be *isomorphic*, for example (1)—mention<sub>n</sub> → mention<sub>v</sub>— or *non-isomorphic*, for example (2)—description → describe:

- (1) I have **made** no **mention** of the Colour of their Eyes, not knowing what Colour they have been of; (Edwards 1743)
- (2) Accurate **descriptions** of animals whose parts are not easily seen or obvious, and anatomical researches, are not in the capacity of every one to **make**; (Donovan 1794)

This does not mean that the verb and the complex predicate have exactly the same meaning (Dixon 1992, Traugott 1999), but authors claim that both should coexist if we want to study their different usage. To be considered a complex

predicate in our study, this condition had to be fulfilled at the time these texts were written. In this case, we had to check if the corresponding verb was still in use when the text was written. To do this the *OED* was used as core information. Consequently, only when the dates of the examples included in the *OED* evidenced of their existence in the 18<sup>th</sup> century, our *make* plus noun structures were considered *CPs*.

#### 4 Analysis of data

As we have mentioned above, the texts selected for this pilot-study were taken from one of the disciplines encompassed by the *CC*, namely, the 18<sup>th</sup> century part of the Life Sciences subcorpus. Our first aim has been to check the use of *CPs* made by these 18<sup>th</sup> century scientists. In this article, we present the first approach to this discipline, and with the compilation of the corpus still in progress, we have decided to use a selection of texts written between 1700 and 1800 totalling 101,600 words (Table 2). The length as well as the number of samples have been considered adequate following Biber's criteria (1993: 252) according to which 1,000 words is an acceptable length for the text extracts when we search "common linear linguistic features". In the same way, 2,000 words would be enough to study "features distributed in a curvilinear fashion". On the other hand, the number of texts selected for this study (ten) is also the one proposed by Biber (1993: 252) in order to study the linguistic variation across different registers. In this case, we have considered that all texts belong to the same discipline within scientific writing, as explained in section 2:

Table 2: Corpus searched

Author	Title	Date	Words
Keill, James	<i>Essays on Several Parts of Animal Oeconomy.</i>	1717	<b>10,300</b>
Gibson, William	<i>The Farriers New Guide: Containing First, the Anatomy of a Horse, [...]</i>	1720	<b>10,300</b>
Boreman, Thomas	<i>A Description of Three Hundred Animals; Viz. Beasts, Birds, Fishes, Serpents, and Insects. With a Particular Account of the Whale-fishery.</i>	1730	<b>10,181</b>
Edwards, George	<i>A Natural History of Birds.</i>	1743	<b>10,180</b>
Hughes, Griffith	<i>The Natural History of the Island of Barbados.</i>	1750	<b>10,592</b>
Dodd, James Solas	<i>An Essay towards a Natural History of the Herring.</i>	1752	<b>9,876</b>

Borlase, William	<i>The Natural History of Cornwall. The Air, Climate, Waters, Rivers, Lakes, Sea and Tides [...]</i>	1758	<b>10,200</b>
Donovan, Edward	<i>Instructions for Collecting and Preserving Various Subjects of Natural History: as Animals, Birds, Reptiles, Shells, Corals Plants, &amp;c.</i>	1794	<b>10,192</b>
Goldsmith, Oliver	<i>An History of the Earth, and Animated Nature. Vol 8.</i>	1774	<b>10,369</b>
Smith, Sir James Edward	<i>The Natural History of the Rarer Lepidopterous Insects of Georgia.</i>	1797	<b>9,484</b>
<b>Total</b>			<b>101,674</b>

The *make*-complex predicates extracted from this subcorpus of the CC are shown in Table 3. As mentioned, this research has a historical perspective, so the criterion used to select the examples that would be investigated is that the collocation found should have been considered a CP in the period under examination. It implies that it should have a related verb still in use at that time and therefore the findings that did not fulfil all our requirements for this analysis were not included. For instance, the verbs for which in the column “Last Eviden.” (see Table 3) the *OED* attests to a date prior to the text publication date were excluded. Even in the case that the compilers of the *OED* could have missed some existing examples, the utility of this dictionary for historical linguistic research has already been widely acknowledged and therefore it can, accordingly, be considered a valid tool for our research purposes.

Following the criteria established for this study, collocations such as *make way* (three tokens), *make an effort* (one) *make slave* (three) *make a digression* (one) *make a lather* (one) *make a journey* (one) *make a dish* (one) *make a haven* (one) *make an alteration* (one) and *make a dam* (one token) were not included in our counts either because they cannot be considered CPs at the time the text was written, or because they are not CPs at all. Table 3 shows the results organised in the following way. The column labelled “Verb” includes the isomorphic and non-isomorphic related verbs. The numbers after the verb refer to the information found in the *OED*. Thus, the first number identifies the entry found in the *OED*, first window, and the one after the colon, the meaning given within the entry to be used instead of the CP. For instance, in the case of *advance*1:3, number 1 refers to the first entry for the verb *advance* and 3 for the third meaning within the entry. The second, third and fourth columns show information taken from the *OED*, the meaning of the verb and the first and last evidence shown in this dictionary. The fifth column “#” includes the number of times this verb was used in our corpus. Finally, the last three columns refer to the noun involved in

the *CP*. Column six shows the noun found in the corpus; the next one displays the date on which the text was published and the last one shows the number of *CP* tokens found in our corpus.

Table 3: Corpus findings

Verb	Meaning	First eviden.	Last eviden.	#	Noun	Date	#
<i>Advance1: 3</i>	To make progress	1704	1866	3	<i>advance</i>	1758	1
<i>Appear1: 1</i>	To come forth into view	1375	1855	52	<i>appearance</i>	1758 1774	1 1
<i>Arrange1: 6</i>	To come to an agreement	1796	1831	1	<i>arrangement</i>	1797	1
<i>Attempt1: 1</i>	To make an effort	1513	1850	0	<i>attempt</i>	1794	1
<i>Choose1: 1</i>	To take by preference	893	1856	6	<i>choice</i>	1794 1774	1 1
<i>Circuit1: 1</i>	To make the circuit of	1549	1879	0	<i>circuit</i>	1752	1
<i>Collect1: 1c</i>	To make a collection	1749	1888	6	<i>collection</i>	1794	1
<i>Depredate1: 2</i>	To make depredations	1797	1888	0	<i>depredations</i>	1774	1
<i>Describe1: 2</i>	To set forth in words	1513	1874	17	<i>description</i>	1794 1797	1 1
<i>Differ1: 2</i>	To make unlike	1400	1867	15	<i>difference</i>	1774 1797	1 1
<i>Discover1: 4</i>	To divulge, to reveal	1300	1751	21	<i>discovery</i>	1720 1774 1794	1 1 1
<i>Divide1: 1</i>	To separate into parts	1374	1849	43	<i>division</i>	1752 1758	1 1
<i>Doubt1: 2</i>	To hesitate	1340	1797	3	<i>doubt</i>	1750	1
<i>Draught1: 1</i> <i>Draft 1:</i>	To draw off To make a draft	1714 1828	1868 1878	0 0	<i>draught</i>	1743	1
<i>Draw1: 59</i>	To trace a figure by drawing a pencil	1305	1890	16	<i>drawing</i>	1743	2
<i>Enter1: 9b</i>	To make an entrance	1380	1860	12	<i>entrance</i>	1758	1

<i>Escape1: 1</i>	To gain ones liberty by flight	1292	1841	2	<i>escape</i>	1730 1750	<b>1</b> <b>2</b>
<i>Estimate1: 2</i>	Form an approximate notion of	1669	1885	0	<i>estimate</i>	1717 1758	<b>1</b> <b>1</b>
<i>Exit1: 1</i>	To make one's exit	1607	1890	0	<i>exit</i>	1750	<b>1</b>
<i>Experiment1: 3</i>	To make an experiment	1524	1900	0	<i>experiment</i>	1774 1794	<b>1</b> <b>2</b>
<i>Fire1:2b</i>	To ignite	1393	1860	0	<i>fire</i>	1752	<b>1</b>
<i>Harvest1: 1</i>	To reap, to gather in	1400	1858	0	<i>harvest</i>	1758	<b>1</b>
<i>Haste1: 3</i>	To make haste	1300	1871	1	<i>haste</i>	1758	<b>1</b>
<i>Hole1: 1</i>	To make a hole	1000	1890	0	<i>hole</i>	1730 1794	<b>1</b> <b>1</b>
<i>Impress1: 6a</i>	To produce a deep impression	1736	1886	0	<i>impression</i>	1758	<b>1</b>
<i>Line1: 4</i>	To trace with a line	1600	1889	4	<i>line</i>	1774	<b>1</b>
<i>Mend1: 4</i>	To make amends or reparation	1300	1841	0	<i>amends</i>	1717	<b>1</b>
<i>Mention1: 1</i>	To make mention	1530	1975	14	<i>mention</i>	1743	<b>1</b>
<i>Noise1: 4b</i>	To make a noise	1400	1867	0	<i>noise</i>	1730 1750 1797	<b>1</b> <b>1</b> <b>2</b>
<i>Object1: 4a</i>	To urge as an objection	1400	1855	2	<i>objection</i>	1752	<b>1</b>
<i>Observe1:9b</i>	To make an observation	1559	1854	0	<i>observation</i>	1750 1758 1794	<b>1</b> <b>1</b> <b>1</b>
<i>Open1: 2c</i>	To give access to	1560	1865	9	<i>opening</i>	1794	<b>1</b>
<i>Pressure1: 1</i> <i>Press1:1</i>	To exert pressure on To act upon with a continuous force	1939 1300	1973 1893	0 8	<i>pressure</i>	1717	<b>1</b>
<i>Room1: 2</i>	To clear a space from persons or things	1375	1816	0	<i>room</i>	1720	<b>1</b>
<i>Research1:1b</i>	To make researches	1781	1977	0	<i>research</i>	1794	<b>1</b>
<i>Retreat1: 1d</i>	To recede	1863	1878	0	<i>retreat</i>	1774	<b>1</b>
<i>Scare1: 1</i>	To frighten	1200	1875	0	<i>scarcity</i>	1758	<b>1</b>

<i>Sink1: 18</i>	To excavate	1358	1875	0	<i>sinking</i>	1794	<b>1</b>
<i>Skew1: 6</i>	To depict	1872	1981	0	<i>skew</i>	1743	<b>1</b>
<i>Stop1: 35</i>	To make a halt	1743	1901	4	<i>stop</i>	1730	<b>1</b>
<i>Suppose1: 2</i>	To form an idea of, to imagine, guess	1386	1781	32	<i>supposition</i>	1717	<b>1</b>
<i>Trial1: 1</i>	To submit to a trail	1981	1984	0	<i>trial</i>	1774	<b>1</b>
<i>Use1: 7a</i>	To make use	1315	1884	19	<i>use</i>	1750 1752 1774	<b>2</b> <b>1</b> <b>4</b>
<b>Total</b>				<b>290</b>			<b>67</b>

To analyse these *CPs* we have considered the following variables: the first one (4.1) involves extralinguistic criteria such as age and geographical distribution of the author, the period involved and the degree of technicality of the texts; the second one (4.2) focuses on the syntactic patterns observed; the third one (4.3) concentrates on noun morphology, and the last one deals with the coexistence of both *CPs* and related verbs.

#### 4.1 Extralinguistic variables

Bailey (1999: 228–229), when describing 19<sup>th</sup> century English, explains the sociolinguistic implications of using expressions such as *have a look* instead of the verb *to look*, pointing out that “using nouns instead of available verbs, at least sometimes, was socially threatening”, he also explains that the fact of using nouns at that time was a sign of modernity but identified at the end of the century with lower social classes. Taking into account Bailey’s opinion for 19<sup>th</sup> century English, our study was focussed on searching for some extralinguistic features that might have any effect on the increase or decrease of *CPs* in 18<sup>th</sup> century scientific texts. The variables studied to establish a potential cause-effect relation are the following:

– Age of the author when the text was published:

As we have only included first editions in our corpus, we have taken for granted that the date of publication and the date when the text was actually written should have been very similar. Therefore, we can check if these *CPs* could have been more frequently used by young or mature scientists.

– Place of birth:

Previous studies have attracted our attention to this feature (Lareo 2006). The place of birth understood as the cities or regions where the authors have spent their childhood, acquiring their linguistic habits, seem to have an effect on the use of these constructions. Our aim is to find out if those previous results from a literary corpus might be supported by the data obtained from a scientific corpus.

– Time-span:

This research was focused on the period 1700–1800. This time-span allows us to observe if this type of *CP* has decreased or increased in number, and also if these variations may be affected in some way by the linguistic tendencies followed throughout the 18<sup>th</sup> century. As some researchers have pointed out the increasing use of collocations after 1800 (Strang 1986, Dixon 1992, Görlach 1999, Bailey 1999), we will test if this tendency was also followed in our 18<sup>th</sup> century scientific texts.

– Technicality: colloquial versus formal register:

The degree of technicality of our samples was also considered as a promising result variable. Previous studies on collocations (complex predicates as well as composite predicates) pointed out that these constructions are more commonly found in a colloquial than in a formal register (Poutsma 1926, Curme 1947, Wierzbicka 1982, Dixon 1992). Assuming this assertion, we have classified the texts according to their degree of technicality or colloquialness.

These data, as well as the date of publication, number of words and tokens found in each text and the normalized figures per 1,000 words are displayed in Table 4:

Table 4: Linguistic and extralinguistic information of the selected sources

Period	Author	Birth	Age	Category	Date	#	Words	N
1700–1750	Keill, J.	Edinburgh	44	essay	1717	4	10,300	<b>0.39</b>
	Gibson, W.	London	40	handbook popular	1720	2	10,300	<b>0.19</b>
	Boreman, Th.	London?	?	textbook popular	1730	4	10,181	<b>0.39</b>
	Edwards, G.	Stradford Essex	49	encyclopaedia	1743	5	10,180	<b>0.49</b>
	Hughes, G.	Merioneth Wales	44	treatise	1750	8	10,592	<b>0.75</b>
	Total					23	51,563	<b>0.45</b>
1750–1800	Dodd, J. S.	London	32	encyclopaedia	1752	5	9,876	<b>0.50</b>
	Borlase, W.	Pendeen Cornwall	62	treatise	1758	10	10,200	<b>0.98</b>
	Goldsmith, O.	Kildare Ireland	46	handbook popular	1774	13	10,369	<b>1.25</b>
	Donovan, E.	Cork	26	handbook popular	1794	11	10,192	<b>1.08</b>
	Smith, J. E.	Norwich	38	encyclopaedia	1797	5	9,484	<b>0.52</b>
	total					44	50,121	<b>0.88</b>
<b>Total</b>						67	101,674	<b>0.66</b>

It is interesting to note that the results obtained after applying each of these parameters are completely different. Whereas age does not seem to have a direct relation to the number of *CPs* used (Table 4), the authors’ geographical distribution presented in Figure 1 reveals that the writers with Irish origin (Goldsmith and Donovan) together with the ones from the middle West (Hughes from Merioneth and Borlase from Cornwall) use a higher number of *CPs*.

The tokens found in the Irish writers’ works, however, lead to the most striking results because they are almost double the findings obtained from other regions (both with normalized figures per 1,000 words higher than 1.00). A similar behaviour was also observed in Lareo (2006), a study of collocations with the verbs *have*, *take*, *make* and *do* followed by a noun carried out on a 19<sup>th</sup> and

20<sup>th</sup> centuries fiction corpus. The number of tokens found in texts written by Irish authors in both studies suggests a connection between the Irish educational background, linguistic habits and the use of complex predicates. In Lareo (2006) the explanation offered was the richness of vocabulary used in those novels and the inclusion of different registers and regional variations in the same text. But as we are dealing with scientific writing, texts are not supposed to be colloquial, so our supposition is that there is a direct relation between the use of *CPs* and the linguistic habits acquired by Irish people at the time. On the contrary, the results obtained from the writers related to the East part of England and Scotland are less significant (Keill 0.39, Boreman 0.39, Dodd 0.40, Smith 0.52, listed in chronological order).

From a chronological point of view the analysis of the data showed a direct relation between the time-span and the use of *CPs* (Table 4). In the last column, the row “Total” of the first and second half of the century shows a gradual increase of tokens. Therefore, we can conclude that the general tendency followed by this subcorpus of the *CC* shows a gradual increase of complex predicates from the first half of the century to the second one (0.45 vs. 0.88). The behaviour shown by *CPs* has been also examined in Lareo (forthcoming b), in a study of *make*-complex predicates on other disciplines of the *Coruña Corpus* (19<sup>th</sup> century Mathematics and Astronomy). Although this study was based on smaller equiparable parts of these two different categories, the total amount of words searched was the same as the one taken for this analysis. The results obtained in that study were more balanced. For the first half, 46 tokens (0.85) were found; and for the second half, the number of tokens was 39 (0.84).<sup>5</sup>

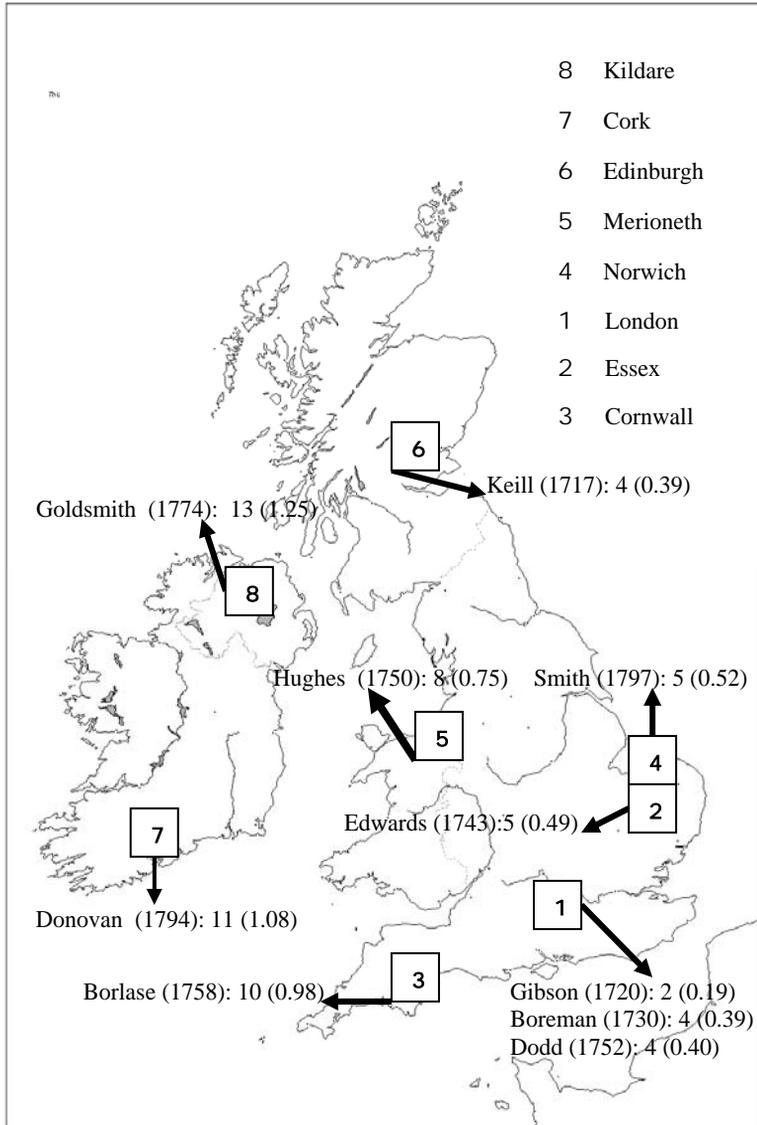


Figure 1: Authors' geographical distribution

When analysing the samples, we also observed that according to the degree of technicality, displayed on the “Category” column, our results seem to corroborate the ones obtained in the study by Lareo and Moskowich (forthcoming) for *CPs* formed by *make* plus adjective. In our corpus, the more popular texts (published in 1720, 1730 and 1794) include only 17 *CPs*, whereas from those that have a higher degree of technicality, essays and treatises (published in 1717, 1750, 1758 and 1774), we have obtained 35 tokens.

This first classification of the texts was made taking into account extralinguistic information included in the work. For instance, Gibson’s text (1720), as he mentions in the preface, was written as an easy guide for farriers. The part analysed contains the anatomy of the horse clearly explained. The author himself after criticising the works of Signior the Ruini and Mr. Snype, the late farrier of Charles II, says: “we have in our Anatomical Part, wholly study’d the Benefict of such as are unacquainted with the Subject, having describ’d all the Parts of a Horse [...] in as short as concise Manner as possible”. His intentions are recognised at the end of this preface, as well, when he explains: “we judged necessary to render it more intelligible and useful”. Likewise, Edwards (1743) and Donovan (1794) include in their prefaces useful comments. Edwards, referring to the errors the reader could find in the book, speaks about the capacity of the potential “common” reader of the book to correct them. Donovan, calling his book a “pocket assistant”, directly mentions the addressee of his writing, an “unexperienced” collector. It is evident then, that besides the general instructions given for beginners, the text is addressed to a popular reader.

Lastly, the texts classified as encyclopaedic would be in the middle of the scale, having a total of 15 tokens (five tokens each). This is not the expected result, since the use of collocations, more precisely *CPs*, seemed to be a popular rather than a scientific device, as the previously mentioned authors claimed. On the contrary, our data seem to corroborate Biber et al.’s opinion (2000: 1028–1029) about the use of these constructions in written as well as in spoken language, an opinion that, in fact, contradicts the previously mentioned statement of colloquialness. Although their results support the view that this type of collocation<sup>6</sup> with *have* could be more frequently used in conversation, they point out that this use of *make*, *have* and *take*, when they are combined with a noun, is “by far more common” in written registers, more precisely in news reportage and academic prose. Finally, the results of the Early Modern English survey made on different corpora, covering the period 1500–1740 (see Table 1), also reflect the frequent use of these constructions in formal contexts and written registers as well as in a more personal style and dialogues.

## 4.2 Linguistic variables

Linguistic features such as syntactic patterns in which the *CP* was embedded and morphological features involved have also attracted our attention. From a syntactic point of view, complex predicates can follow different patterns. It becomes necessary, then, to observe some distinctive features so as to detect the most common ones. In our opinion, we could fulfil this aim by following a minute classification which better highlights the occurrences of zero modification. These cases are considered by Kytö (1999: 186) the stronghold of idiom formation. Our classification, explained and followed in Lareo (forthcoming a), allows the distinguishing of cases in which the noun can be modified by lexical elements different from articles as well. We have identified three basic patterns of verb plus noun collocations, classifying them as follows:

Pattern A: DET + N

This group encompassed cases in which the noun may be preceded only by the definite or indefinite article, as in (3) and (4), for instance:

- (3) I made the drawing [...] (Edwards 1743)
- (4) [...] through a hole made for that purpose (Donovan 1794)

Pattern B: (DET) + ADJ + N

This group contains collocations in which the noun is always premodified by at least one adjective. These noun phrases may be preceded by an article. Examples (5), (6) and (7) were extracted from our corpus:

- (5) [...] making his escape (Hughes 1750)
- (6) [...]; the first division made (Dodd 1752)
- (7) [...]; I shall therefore make this easy supposition (Keill 1717)

Pattern C: Ø + N

The last pattern comprises only the examples in which the noun immediately follows the verb without modification at all, for instance, (8) and (9):

- (8) she made haste (Borlase 1758)
- (9) [...] help to make room for the air (Gibson 1720)

Table 5 below displays the syntactic patterns and occurrences found for *CPs* in our corpus. The second column includes the individualized figures for both articles (*a/an* and *the*). The third one displays the normalized figures for every

1,000 words of the whole 101,674 words. The last column shows the percentages of the listed patterns, or the occurrences out of the number of *CPs*.

Table 5: Syntactic patterns (A,B,C) followed by our findings

Patterns	#			N (101,674 words)	% (67 <i>CPs</i> )
	a/an the	11 4	15		
PA: DET + N			31	0.15	<b>22.39</b>
PB: (DET) + ADJ + N			21	0.21	<b>31.34</b>
PC: Ø + N			<b>67</b>		
<b>Total</b>					

Table 5 shows that our *CPs* are mainly modified by adjectives, precisely one of the reasons adduced to their usage. However, the most interesting result is the one obtained by pattern (C). This pattern, as already mentioned, better shows the dependency, lexicalization or grammaticalization process followed by some of these constructions. Our figures also support Moralejo's opinion (2002, 2003)<sup>7</sup> about the reason to choose these analytical constructions. She also observed that the syntactical variation these collocations offered, namely, to break the strict English word order and to include modifiers, is not the only reason to use them.

Moralejo, however, followed a different classification proposed by Hiltunen (1999). Thus, we have also decided to take Hiltunen's model to make the comparison with future and previous studies possible (Lareo forthcoming a, Lareo forthcoming b). He identifies the four patterns that follow:

Pattern 1: verb + a / an + (Modifier/s) + noun

Pattern 2: verb + (Modifier/s) + noun

Pattern 3: verb + the + (Modifier/s) + noun

Pattern 4: verb + (the) + (Modifier/s) + noun plural

Only the first three of Hiltunen's types have been considered for this study. Pattern 4 is not a significant case for us because the nouns involved in *CPs* followed the morphological rules to form their plurals. Besides, when the noun is used in the plural with a specific meaning, i. e. when the dictionary has an entry for that plural form, we take it as a normal noun ending in *-s*.

In Table 6, the distribution of Hiltunen's patterns, the number of tokens and the normalized figures and percentages of *make*-complex predicates in our scientific writings are shown:

Table 6: Distribution of Hiltunen's patterns in our sub-corpus of the CC

Syntactic pattern	#	N (101,674 words)	% (67 CPs)
P1- A + (Mod) + N	22	0.22	<b>33.8</b>
P2- (Mod) + N	36	0.35	<b>53.7</b>
P3- THE + (Mod) + N	9	0.09	<b>13.4</b>

The results displayed on Table 6 point out a predominant use of modifiers, more specifically adjectives and possessive pronouns, when the writer chooses these analytical constructions. The versatility of modification constructions such as our *CPs* offer was already pointed out by Jespersen (1954: 117). Nevertheless, although Nickel (1968: 15) presents this quality as the main reason to use this type of collocation, the possibility of being modified should not be taken as the only reason to use *CPs* (Moralejo 2002, 2003). As already mentioned, the fact that the results obtained for pattern C (Table 5), the one in which only the noun follows the verb *make*, without any intervening material, are very near to the ones found for pattern B supports that opinion.

The nouns that are always used in our corpus without any modifiers are: *trial*, *depredations*, *sinkings*, *openings*, *objections*, *use*, *amends*, *room*, and *haste*. Among these, the *CP* formed with *make* and *use* is the type with more occurrences (seven tokens). Above, we present these nouns in their plural forms when a noun was the only form found in our corpus, but these forms cannot always be considered as common plurals. Their plural form is not always relevant except when the plural implies a change in meaning. For instance, in the case of *depredations* (10) and *amends* (11), the plural form seems to be the only possibility. In fact, the *OED* includes a specific meaning for these words: *depredation* 2b. “*pl.* Destructive operations, ravages (of disease, physical agents)”; and the entry for *amend* has only a link to the entry *amends*. The other nouns in plural are regular plurals:

- (10) In this manner they leave from six to a dozen of their eggs, within the fatty substance of the reptile's body, and then fly off to commit further **depredations**. (Goldsmith 1774)

- (11) [...] and that two Fluids of different Viscidities may be separated at the same vicinity to the Heart, if the quantity of the Contacts of the Particles be such as will make **amends** for their want of Solidity (Keill 1717)

As mentioned above, another linguistic feature studied was the morphological process undergone by the nouns involved in our *CPs*. The two morphological processes used, conversion and derivation, yielded different results, as shown below in Table 7. Most tokens of the nouns involved in *CPs* in our corpus are isomorphic (58.2% to 41.8%). Our results coincide with Kytö's (1999: 174–175) for the period 1500–1710 with the Helsinki Corpus. She pointed out that comparing the results of the most common light verbs found in English *make* and *have* co-occurred with isomorphic nouns less frequently than *take* and *do*. Nevertheless, she concludes that the nouns recorded in her study were predominantly isomorphic, as it is the case in our survey. Conversely, in Lareo (forthcoming b) the results obtained with a 19<sup>th</sup> century selection of the *CC*, containing texts of Astronomy and Mathematics, derivation was by far more common (30.5 to 69.4). So, further research should be done to prove whether or not the morphological processes undergone by the nouns involved in *make*-complex predicates have a direct relation to the period or to the category under survey.

Table 7: Morphological process results

	Isomorphic	%	Non-isomorphic	%
Tokens (67)	39	58.2	28	41.8

## 5 *Complex predicates and related verbs*

The last section of this study has been devoted to the comparison between related verbs and *CPs* frequencies. The use of these collocations in scientific writing has already been attested in this paper, as well as in previous studies with the *CC*, supporting the idea that scientific texts show an exceptionally high proportion of nouns in relation to verbs (Huddleston 1971, Sager *et al.* 1986, Halliday and Martin 1993, Crespo and Moskowich 2006, Moskowich and Crespo 2007). This result is explained due to scientists' greater emphasis on ideas and not on actions. Gotti (2005: 166) also mentions the evolution of the syntax of scientific English and the new research methodology as important elements conflicting with the limitations of the English language. Scientists make linguistic decisions as well, showing their preference for the use of deverbal nouns that

implied a decline in the use of verbs. But this tendency leads to the creation of new words such as the deverbal nouns as well as the denominal verbs. These two elements are the focus of our following search for *CPs* and their related verbs.

As the main element of our *CPs* is also a noun, our results support those previous opinions. But we do not yet take for granted Nickel's (1968: 2) statement about the "marked tendency in modern English, scientific as well as colloquial, to use complex verbal structures in place of simple verbs". In attempt to verify this assertion, all etymologically related verbs, isomorphic and non-isomorphic, were examined in our corpus to observe the tendency followed by our texts.

As pointed out in previous studies on collocations, these constructions cannot always be replaced by a related verb keeping more or less the same meaning. Therefore, only the examples with verbs in which the meaning of the verb most clearly matches the meaning of the *CP* were counted. Thus, examples such as (12), representing a different meaning of the verb *appear1*, and (13), another meaning of the verb *observe*, were excluded because they do not have the same meaning as the *CPs* found in our corpus in which the corresponding nouns are involved. On the contrary, examples such as (14), with the verb *appear2*, and (15), with the verb *escape1*, were taken into account because they maintain more or less the same meaning as the *CPs* included in (16) and (17) respectively:

- (12) And since it will appear, that the whole Animal Oeconomy does likewise depend upon this attractive Power [...] (Keill 1717)
- (13) In Asia and Africa they have been observed by travellers in many parts [...] (Donovan 1794)
- (14) It is evident the Sprats are young Herrings, since they *appear* immediately after the Herrings are gone [...] (Dodd 1752)
- (15) They are brought to us with much Difficulty, many dying for one that *escapes* in the Voyage (Edwards 1743)
- (16) [...] the males and females, that are furnished with four large wings each, are more slow in **making their appearance** (Goldsmith 1774)
- (17) The latter soon afterwards **making his Escape** also, his Mother, in a short time, pined to Death (Hughes 1750)

Scientific writing has evolved apace with scientific methodology and thought (Atkinson 1999, Valle 1999, Taavitsainen and Pahta 2004, Esteve 2006, Lareo

and Montoya forthcoming); therefore, our study of 18<sup>th</sup> century scientific texts might yield different results than the ones focused on latter periods. Expectedly, contrary to Nickel's comment on Present-Day English (1968), the findings of our search show a striking difference in the use of *CPs* and related verbs. Whereas only 67 complex predicates (normalized figure 0.66) were found, the number of examples using related verbs in this corpus is evidently higher, namely, 290 occurrences (2.85). The results of this last search are displayed in Table 3, in the fifth column under the heading “#” (tokens or occurrences of each verb). As already mentioned, these figures only include the occurrences in which the meaning of the verb matches the meaning of the *Complex Predicate*.

## 6 Concluding remarks

In this paper we have studied the use of one type of collocation formed by *make* followed by a noun in 18<sup>th</sup> century scientific writing. The type of collocation searched was the one called by Cattell (1984) Complex Predicate and the texts surveyed were taken from the Life Sciences subcorpus included in the *Coruña Corpus of English Scientific Writing*.

We have focused our attention on several points concerning sociolinguistic and linguistic features, obtaining expected as well as unexpected results. The first extralinguistic variable analysed was the age of the author when the text was published. Although they range from 26 to 62, this parameter seems to be irrelevant for the topic under examination.

The next feature studied was the author's origin. The results obtained show that this variable is important when dealing with Irish authors and, to a lesser degree, with the ones born or raised in the middle West. This increase in the use of *CPs* in texts written by Irish authors was already observed in previous studies based on literary texts. Our future aim, therefore, would be to investigate the linguistic habits acquired by Irish writers that use English as the language of their writings to find a possible connexion.

The chronological variable has also revealed that our texts show a gradual increase of *CPs* from the beginning to the end of the century. The fact that previous studies based on different 19<sup>th</sup> century disciplines of the *CC* gave results with a more similar number of occurrences encourages us to keep researching this topic. A future comparison between disciplines from a chronological point of view could also determine if each discipline of the *CC* has its own distinctive linguistic features, or, to the contrary, it would not affect the perspective of considering scientific writing as a unity with minor variations.

The last feature analysed was the degree of technicality, understood as the scale from a colloquial to a formal register. Taking into account previous opinions about the use of collocations, the results were unexpected. The texts with a higher degree of technicality showed more tokens than the ones classified as more popular. This result shows that *CPs* were also a scientific linguistic device at that time, regardless of register.

Linguistic variables such as morphological features and syntactic patterns followed by our *CPs* have also been analysed. The morphological analysis of the nouns showed that most of them are isomorphic, coinciding with Kytö's results for an earlier period. As expected, our *CPs* showed a clear tendency to be modified. However, the fact that the next pattern in frequency was *PC* (the one in which the noun immediately follows the verb) could reveal a step in a process of lexicalization or grammaticalization.

Although we have verified that *make* complex predicates are also a linguistic device of 18<sup>th</sup> century scientific texts included in the category of Life Sciences of the *CC*, the scientists' preference for using verbs rather than *CPs* was observed. This result is explainable taking into account that the aim and nature of scientific writings is to describe how the results were achieved using a more concise and precise language. In this sense, the advantages collocations such as *CPs* offer, namely, allowing for more flexibility in the strict word order of English and therefore more syntactic possibilities, do not seem to be as necessary for this register.

One of our future aims would be to compare the evolution of *make*-complex predicates found in the *CC*, analysing them from different points of view. The first one considered would be to expand the chronological span, to make possible the comparison of different subcorpora from 1700 to 1900. The type of text (treatise, essay, encyclopaedia, handbook, text-book, etc.) would be another interesting variable to consider, together with the discipline involved. We hope that these future studies will help to enhance and complement our knowledge of the use and evolution of this particular aspect of scientific English.

**Appendix: Fields of Science and Technology (International Standardisation of Statistics on Science and Technology, UNESCO 1978)**

(Lareo forthcoming a)

**I. Natural Sciences.**

Astronomy, bacteriology, biochemistry, biology, botany, chemistry, entomology, geology, geophysics, mathematics, meteorology, mineralogy, computing, physical geography, physics, zoology and other allied subjects.

**II. Engineering and Technology.**

Engineering sciences such as: chemistry, civil, electrical and mechanical engineering and their specialised subdivisions; forest products; applied sciences such as geodesy, industrial chemistry, etc.; architecture, the science and technology of food production; specialised technologies of interdisciplinary fields, e.g. systems analysis, metallurgy, mining, textile technology and other allied subjects.

**III. Medical Sciences.**

Anatomy, stomatology, basic medicine, paediatrics, obstetrics, optometry, osteopathy, pharmacy, physiotherapy, public health services, technical health assistance and other allied subjects.

**IV. Agricultural Sciences.**

Agronomy, zootechnics, fisheries, forestry, horticulture, veterinary medicine and other allied subjects).

**V. Social Sciences.**

Anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), law, linguistics, management, political sciences, psychology, sociology, organisation and methods, miscellaneous social sciences and interdisciplinary, methodological and historical S&T activities relating to subjects in this group.

Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences.

**VI. Humanities.**

Arts (history of art and art criticism, excluding artistic 'research'), ancient and modern languages and literatures, philosophy (including the history of science and technology), prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, palaeography, genealogy, etc.), religion, other subjects and humanistic branches as well as other methodological and historical S&T activities relating to the subjects in this group.

**Notes**

1. The research reported on here was funded by Diputación de A Coruña, Universidade da Coruña and the Xunta of Galicia through its Consellería de Innovación e Industria, through its Dirección Xeral de Investigación e Desenvolvemento, grant number PGIDIT07PXIB104160PR, supervised by

Isabel Moskowich. Also, this research has benefited from grant 06I449.01/1 funded by Fundació Caixa Castelló-Bancaja. These grants are hereby gratefully acknowledged. We would like to thank the Department of Hispanic Studies of the University College Cork for its support and assistance in compiling the corpus.

2. “Texts Conventions and Genre Evolution” is one of the research lines of *The Research Unit for Variation, Contacts and Change in English (VARIENG)*. One of the projects carried out by this Research Unit is the compilation of the *Corpus of Early English Medical Writing (CEEM)*, comprising data from 1375 till 1700.
3. Only groups I and II of Claridge’s “verbo-nominal combinations” in which the verbs *make, have, take, do* and *give* are involved in a collocation were taken into account for the totals. These two groups differ only in the compulsory use of an object that must be attached to the nominal part with the help of a preposition. Claridge includes, as members of group I, “simple verb-noun units” such as *take a walk, make a resolution, do harm*, whereas group II is formed by “verb-noun-preposition units” such as *make use of, take care of, give account of* (Claridge 2000: 40, 69–81).
4. Twenty plays by Shakespeare and the *Sonnets*, eleven texts by Marlowe, eight by Middleton, five editions of Webster’s works, three plays by Johnson, two by Marston, two texts by Sidney and single items by Behn, Cowley, Donne, Dryden, Marvell, Milton, Spenser and Udall (Hiltunen, 1999: 135).
5. However, if we focus our attention only on the Astronomy subcorpus, the results obtained from the first and second half of the century increase progressively. 0.72 is the normalized figure per 1,000 words for the first half (17 tokens out of 23,628 words), whereas for the second half the figure is 1.44 (38 tokens out of 26,372 words). This is an interesting fact because the tokens obtained in the Mathematics subcorpus show remarkable differences in their numbers. We considered that the typology of Astronomy texts and Life Sciences texts is the same in the sense that all the texts are descriptive. On the contrary, the Mathematic texts included are argumentative.
6. These collocations are described by Biber et al. (2000: 1026) as “relatively idiomatic expressions”.
7. Her research concentrated on composite predicates in the Middle English section of the *Helsinki Corpus*.

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