Rosita Maglie

Understanding the Language of Medicine

TABLE OF CONTENTS

Understanding the Linguistic Features of English for Medical Purposes

I. EMP from a Diachronic Perspective

Notwithstanding the purpose of this book is not the analysis of the evolution of Medical English during the centuries, a brief but special mention should be made of Helsinki group's works[1] investigating this linguistic variety from a diachronic point of view.

Their studies of Helsinki Corpus of English Texts have provided concrete evidence of variation within genres of the early periods. For instance, the corpus shows that umbrella categories like 'religious treatises' or 'scientific writing' contain very heterogeneous texts (Taavitsainen 1993, 1994a).

They start to investigate western science when it was initiated by the ancient **Greek scientists** in their search for principles of nature and, at the same time, for principles of argumentation for presenting their ideas. New generations of scientists based their studies on texts written by their predecessors; changes were gradual and took place within the old framework. The line continues from **scholasticism** to **empiricism** and then to **rationalism**, and the outline is characterized by the dichotomy between science which blindly relies on authorities in contrast to empiricism, on the one hand, and the rationalistic view on the other hand. Different periods are traditionally connected with different styles of thinking and decision-making. Styles of thought change, and the underlying philosophy of science can be verified by an analysis of language. Scientific conceptions, objects of inquiry, methods, evaluations, and intellectual commitments are mediated

---

[1] VARIENG is a Centre of Excellence for the Study of Variation, Contacts and Change in English. It has about 50 members from the Universities of Helsinki and Jyväskylä, and is funded by these two universities and the Academy of Finland for the period 2006-2011. VARIENG members study English in its social, regional and discourse contexts. Special attention is given to the development of the English language from its earliest stages up to its present-day varieties. VARIENG members focus on empirical research. They compile and utilize electronic corpora of English, and develop tools and methods for corpus-based and ethnographic studies. These resources make up an essential part of the VARIENG infrastructure, and also benefit the research community at large.

through language, both as regards the micro-level linguistic features and the macro-level argumentative structure. The co-occurrence patterns of various linguistic features make up the text, and an assessment of textual strategies reveals how knowledge is communicated. For example, scholastic writing employs prescriptive phrases, impersonal structures and the passive voice in imitation of Latin scientific writing, while texts of the Royal Society period are written as first person narratives with low modality (Taavitsainen 1994b).

The late middle ages in England saw the flowering of scientific writing in the vernacular[2], taking English discourse in new directions and establishing new textual genres. Medical professionals had common public goals, intercommunication and participation mechanisms, genres of communication[3], special lexis, and membership was acquired by a learning process even in the late medieval and early modern periods. Precise socio-historical facts about the writers and readers of the earliest texts are, however, difficult to obtain, but written sources indicate that communication between experts and lay people on medical matters and issues pertaining to health was important since the beginning of scientific writing (Taavitsainen 2001). In their recent book, Irma Taavitsainen and Paivi Pahta (2004) examine the sociolinguistic causes and effects of the process of **vernacularization**, on the basis of the empirical evidence from manuscripts and a large computerized corpus[4]. Topics

---

[2] Vernacularization of scientific writings started in the fourteenth century, in the aspiring intellectual climate and growing national consciousness of Chaucer's England. Medical codices of the period are often bi- or trilingual. Transfer from Latin to English can be seen in some texts very clearly, as in some treatises the language can change in the middle of a sentence, or between sentences or paragraphs. L. Voigts' study (1989) of scientific and medical manuscripts proves this beyond any doubt. Of the 71 entries studied, 10 are in Latin, 37 are bi- or trilingual, either containing treatises in Latin and Middle English or in Latin, Anglo-Norman and Middle English, and 24 are exclusively in Middle English.

[3] The three traditions of writing, i.e. academic, surgical and the remedy-book tradition have proved important in explaining variation in early English medical writing (e.g. Taavitsainen and Pahta 1998).

[4] The electronic Corpus of Middle English Medical Texts (MEMT) consists of medical treatises from c.1375 to c.1500. The corpus contains approximately half a million words of running texts and comprises edited medical texts and early printed books from different

covered include scriptorial 'house-styles', code-switching, translation strategies, and transmission processes. Their book, *Medical and Scientific Writing in Late Medieval English* (2004), offers important new insights into vernacularization, and makes a significant methodological contribution to corpus linguistics[5].

II. EMP from a Synchronic Perspective

This section is about to embark on an emotional discovery journey through the lexical, syntactic and textual features[6] of EMP in order to make the reader aware of the beauty of this specialized language often criticized for its cryptic and obscure nature.

III. Lexical Features of EMP

According to Romich (2001), "studying medical terminology is like learning a new language". At first words look different and complicated. However, by understanding a few important guidelines, medical terminology can become interesting and seem like solving a logical puzzle.

---

traditions of writing. The range is from theoretical treatises transmitting specialized top-level knowledge through learned surgical and anatomical texts to simple recipes for practical use and miscellaneous collections bordering on household literature. The texts differ from each other e.g. in linguistics features indicating involvement and emotionality, such as personal pronouns, imperative forms, and passive and impersonal constructions, in expressions of evidentiality and modality, in the use of appositional constructions, and in meta-discursive practices. MEMT (2005) was compiled by Irma Taavitsainen, Päivi Pahta and Martti Mäkinen and published on a CD-ROM by John Benjamins. Certainly, it serves the need of linguists as well as historians of science, philologists and manuscript scholars.

[5] The team are working on a book *Medical Writing in Early Modern England* (eds. Irma Taavitsainen and Päivi Pahta, Cambridge: Cambridge University Press, forthcoming). Their previous volume *Medical and Scientific Writing in Late Medieval English* (eds. Irma Taavitsainen and Päivi Pahta 2004) was based on the corpus of MEMT (2005). The new book will be based on the corpus of *Early Modern English Medical Texts 1500-1700* (forthcoming in 2009).

[6] The analysis of lexical, syntactic and textual features of EMP follows the framework used by Gotti (1991, 2003) to investigate specialized discourse.

EMP is composed of **vocabulary of classical (Greek and Latin) origin,** e.g. *in vivo, in vitro, deficit, herpes simplex, kyphosis dorsalis juvenilis*[7] – from Greek: e.g. *phleb-, phlebo-* (i.e. phlebitis, phlebotrombosis); from Latin: e.g. *ven-, veno-* (i.e. venesection, venoatrial)[8] (Webber 1996:17)[9] and **vocabulary of Germanic (Anglo-Saxon) origin,** e.g., *blister, bruise, graze, freckle, birthmark, chilblains etc*. The **spelling** of medical terms is really crucial. The words *ileum* (i.e. part of the small intestine) and *ilium* (i.e. part of the pelvic bone) (Chabner 1991:3-7) are homophones but their actual meaning is clear when they are embedded in the context.

1. Monoreferentiality vs. Synonymy

EMP vocabulary is characterized by **monoreferentiality** or **semantic univocity**. This implies that in medical language there is only one word for a specific meaning and concept. The term cannot be suitably replaced by a synonym but, rather, by a periphrasis, e.g. *hepatitis* or *inflammation of the liver, due usually to viral infection but sometimes to toxic agents*.

But in EMP there are also occurrences of synonyms, e.g. there are several expressions which refer to *megacolon* which is known as *Hirschsprung disease* by the Danes, whereas as *Ruysch disease* by the Dutch.

---

[7] The examples are provided by the author. But some of them are taken from Webber (1996) and Gotti (2003).

[8] Janet Romich's article (2001) briefly illustrates the morphology of medical terms, providing some abbreviated list of medical suffixes, prefixes, and roots, as well as a couple of examples of morphological rules combining these forms. Learning some basics of medical terminology could be useful not only for medical personnel, but also for their patients, especially if those patients want to do more extending reading on medical topics. The morphological approach to learning medical terms – she states – can be helpful for someone who must learn many vocabulary terms. But that type of approach must be used cautiously since the meaning that results from the combination of a given set of morphemes is not always transparent or predictable.

[9] Most medical terminology has Latin/Greek-based words with English lexicalization:
- headache, cephalgia, cephalgic;
- tooth, dens, dentis, dental, dente.

2. Denotation vs. Connotation

Denotation (i.e. the medical term possesses one precise literal meaning) is another characteristic that typifies EMP. When *brain* is used in this domain it refers to the organ inside your head (e.g. *her father died of a brain tumour*) whereas in standard English it can acquire a connotative value (e.g. *they were not the only ones to have brains and ambition*).

However, in EMP there is a wide use of words or phrases that depart from straightforward literal language, i.e. figures of speech, e.g. **catachresis** (i.e. it expands a word beyond the limits of its own meaning) (e.g. *neck of uterus– corpus/body of uterus– fundus uteri*); **ellipsis** (i.e. it lacks an element that is, nevertheless, recoverable or inferable from the context) (e.g. *Otto's fever, parachute mitral valve*); **eponym** (i.e. it is a person, whether real or fictitious, after whom a particular place, era, discovery, or other item is named or thought to be named) (e.g. *Parkinson's disease – Alzheimer's disease*); **toponym** (i.e. it is a name of a physical or mental disorder derived from a place or a region) (e.g. *Thogoto virus, Rio Bravo Fever*).

2.1. Metaphor: A case of Figure of Speech in EMP

The constant development of science entails a continuous lexical expansion. As a result, to frame new scientific concepts medical English increases its vocabulary with borrowings from other languages, other registers, other branches as well as from everyday experience. In scientific discourse, metaphorical items may also be considered a special form of borrowings from different areas which, once they become part of the specialized language of the discourse community, are eventually accepted as standard terms[10]. Salager-

---

[10] Medical discourse uses not only metaphors but also **idioms**. Since idioms are so culture-specific, one may wonder why they are used at all in a variety of English which is for an international audience. In fact, in the average text they are not used frequently, accounting for only about 1% of the text. They are characteristically found in sections of text expressing the author's opinion. This confirms that even scientific communication cannot be divorced entirely from the author's cultural background, and indeed that a completely neutral and aseptic style would be impossible (Webber 1996:42).

Meyer terms these lexical borrowings called for by the development
of new techniques **bold metaphor** since their stylistic colouring fades
away in the course of time and usage. An example is *screening* which
is the most frequent word in Webber's corpus[11]. After analysing how
the word is used in her corpus she wonders why in science it is used
with the meaning of "the examination of a group of usually
asymptomatic individuals to detect those with a high probability of
having a given disease, typically by means of an inexpensive
diagnostic test' (Stedman's 2000:1608). Consulting the Oxford
Dictionary (OALD) she found in the fifth and sixth place the
congruent or literal sense from which the verbal form has been
derived and which fits the epidemiological sense used to denote a
procedure in the study of diseases in populations, namely,

> 5. *"frame with fine wire netting" doorscreen etc.*
> 6. *"large siege or riddle used for separating coal, gravel etc. into*
> *different sizes by passing it through holes of different sizes".*

In her article, Webber (1996a) also raises the problem that in the
language of science, non-English native readers may not understand
newly coined terms having metaphorical status. Hence the use of
metaphor described by Levinson (1983) as a term which facilitates
comprehension of complex domains may not work for non-native
speakers.

Following Levinson, Rijin-van Tongeren (1997) sees metaphorical
expressions in medical texts as serving not only **didactic** but also
catachretic and **theory-constitutive** functions. The first two are
applied to objects or phenomena that are already known. Didactic
metaphors explain new concepts by means of familiar concepts, e.g.
the transcription machinery of m[essenger] RNA, instantiating both
"the body is a machine" and "a genome is a text". Catachretic
metaphors fill gaps in a vocabulary, e.g. the "blood vessels as rivers"
metaphor, instantiating the conceptual metaphor "anatomy is a

---

[11] Webber's corpus used for her study consists of abstracts of research articles or case
reports (size: 100,000 words) collected from two scientific journals: *International Review of
Paediatric Otorhinolaryngology,* from MEDLINE and *Journal of the American College of
Cardiology*, available on CD-ROM.

landscape". Theory-constitutive metaphors, on the other hand, are applied to phenomena that are not yet known in order to structure them and find out what they are "like".

In her in-depth article entitled Language and Medicine, Fleischman (2001) looks not only at **(a)** the use of metaphors in medicine but also **(b)** metaphors generated by body parts and their afflictions and at **(c)** metaphors medicine has "exported".

(a) She analyses a dominant conceptual metaphor of biomedicine: "medicine is a war" which has long informed the thinking/discourse about infectious disease (Sontag 1978) and more recently about cancer, AIDS, and other epidemic diseases (Sontag 1978, 1990; Van Rijn-van Tongeren 1997; among others). Like all metaphors, "medicine is a war", has advantages and drawbacks. While the imagery of fighting furnishes many patients with motivation, optimism, and comradeship, it can also contribute to desperation or to a sense of personal failure if the disease becomes terminal.

(b) She shows how in virtually every language and every culture body parts serve as metaphors. In English, one needs only think of expressions such as *he hasn't got a leg to stand on; it makes my blood boil; she gets under my skin*; all based on associative meanings attached to the respective body parts.

(c) It follows that body illnesses will become metaphors for "the ill of society". The illness metaphors that medicine has "exported" are too numerous to list. Some that come readily to mind are *being blind to reality*, *deaf to all entreaties*; *having a lame excuse*; *an anaemic economy*; or *your style is cramped*.

To conclude this section, the opinion of Sontag, one the most thoughtful commentators of medicine's metaphorical legacy, has been chosen: "[unfortunately][12] Illness is *not* a metaphor, and the most truthful way of regarding illness – and the healthiest way of being ill – is one most purified of, most resistant to, metaphorical thinking" (Sontag 1990:3).

---

[12] Word added by the author.

3. Precision vs. Imprecision

Each word can be referred to its concept/meaning immediately through the analysis of its form thus leading to the phenomena of **precision** and **transparency.** Words can be analysed structurally and divided into basic components. These components consist of a **prefix** (i.e. an affix occurring at the beginning of a word), a **root** (i.e. the foundation of a word) and a **suffix** (i.e. an affix occurring at the end of a word). For example, the word *hyperglycaemia* can be divided into the following parts, e.g. *hyper·glyc·aemia*. The prefix is *hyper-*, the root is *-glic-*, and the suffix is *-aemia.* After dividing the word into basic components, the definition can be gleaned by examining the suffix, followed by the prefix, and then the root(s). If two roots are present, the word that occurs first in the word is analysed first (Romich 2001:122-123). In the example of *hyperglycaemia, -aemia* is the suffix, meaning blood condition; *hyper-* is the prefix, meaning excessive; and *-glic-* is the root meaning sugar. By putting these components together, it becomes apparent that *hyperglycaemia* is a blood condition of excessive sugar.

On the other hand, in medical discourse there are cases of **imprecision,** e.g. the suffix *-oma* in the term *carcinoma* (i.e. epithelial cancer) denotes a very life-threatening disease cancer. But the suffix *-oma* in *glaucoma* does not imply an eye cancer because this disease is characterized by a rise in the pressure of the eyeball.

In EMP there are also instances of **obscurity**, namely the use of specific words instead of current ones; e.g. *trichotomy* means the trimming of unwanted hair before a surgery.

4. Shortness vs. Redundancy

Shortness also characterizes EMP. It is used in order to express several concepts in the shortest lexical and syntactic form, e.g. *urinalysis* (i.e. urinoanalysis), *contraception* (i.e. contraconception); **acronyms**[13]**,** e.g. *HIV* (human immunodeficiency virus)/*AIDS*

---

[13] The reasons for the extensive use of acronyms are (a) the consequence of sublanguage shaping and use by a relatively closed community and b) efficiency and economicy in use.

(acquired immunodeficiency syndrome) – *HCV* (hepatitis C virus). Other means of condensing medical terminology are **abbreviations** e.g. *CV* (cardiovascular), *Fld* (fluid) and **stacked noun phrases** e.g. *body mass index* (*BMI*). However, there are also examples of **redundancy**, e.g. *caesarean section delivery* where *caesarean* and *section* both imply the cutting of a part of the body.

IV. Syntactic Features of EMP

The atypicality of morpho-syntactic phenomena found in EMP are not quality-related but quantity-related. At a syntactic level, the main phenomena are introduced and analysed in the following sections.

1. Omission of Phrasal Elements

Leading to concise/compressed sentences, the **omission of phrasal elements** is a common means of communicating most rapidly. It does not prejudice the understanding of a text as the value of the missing elements can be re-established by the specialist. This restriction on the number of words used is not due to the specificity of the subject but to the linguistic channel chosen to communicate.

> **Prepositional phrases with *of*, *in*, *on*, *with***:
> e.g. *root nodule bacteria* (bacteria to be found in root nodules)
> **Prepositional phrases with for, usually for + gerund:**
> e.g. *the operating room/theatre* (the room for carrying out operations)

Their forms can be:
- simple: NIDDM = *non insulin-dependent diabetes mellitus.*
- compound: GABAuria = *GABA in the urine.*
- combined: *IgG, IQ 50-70, type A1.*

The combined forms can contain numerals and letters for: types, stage, severity, position, and measures.

2. Expressive Conciseness and Pre-modification

Expressive conciseness and **pre-modification** are other linguistic tools which make the sentence more condensed at a syntactic level. In specialized texts the use of **relative clauses** is avoided for the sake of economy and simplicity of the syntactic structure.

Nouns modified by relative clauses:
e.g. *a blood donor* (a person who donates blood),
e.g. *laboratory equipment* (equipment which is used in a laboratory)
A combination of passive voice and *for* + gerund:
e.g. *crisis intervention techniques* (techniques which are used for intervening in a crisis)

The first possibility is to replace the relative clause with **adjectives**, usually obtained through affixation. The commonly used prefixes and suffixes have specific semantic values, which allow the decoding of their communicative function. Some examples of affixations are: e.g. *measurable lesion* (lesion which can be measured); *reactive force* (force which reacts); *absorbent material* (material which absorbs).

Another device for simplifying a relative clause is the omission of subject and auxiliary when the clause has a **passive form**, as in the following example:

Patients assigned to the combination-therapy group also received irinotecan...
(Patients that were assigned to the combination-therapy also received irinotecan…)

When the verb of the passive form in the relative clause does not take a complement, it precedes the noun it specifies and becomes a past participle used with an adjectival function. For example:

Predefined subgroup analyses included analyses of the patients whose disease progressed after...
(analyses of subgroups which had been predefined included analyses...)

When the agent is expressed, it is placed before the past participle and a hyphen is inserted in between.

Non-treatment-related toxicities
(toxicities which are not related to treatment)

Similarly, the use of the prefix *un-* before a past participle in adjectival position permits the omission of the relative clause in the **negative form**. For instance:

The unwanted liquid was thrown away
(the liquid which was not wanted was thrown away)

When the verb of the passive form is modified by an **adverb**, the latter is placed before the former with a hyphen in between. For instance:

At least one unidimensionally-measurable lesion was required…
(one lesion which can be measured unidimensionally was required..)

Thus and *so* are used not only in order to avoid a relative clause but also to coordinate clauses beginning with expressions like *and in this way*. In so doing, one of the abovementioned adverbs followed by a gerund gives more conciseness to the clause, as illustrated by the following example:

Cetuximab is a chimericIgG1monoclonal antibody that binds to EGFR with high specificity and with a higher affinity than either epidermal growth factor (EGF) or transforming growth factor alpha (TGF-α), thus blocking ligand-induced phosphorylation of EGFR.

Another device to reduce the complexity of a relative clause is the use of **gerund:**

Increasing clinical evidence exists supporting the notion that radiotherapy dose-escalation results in improved prostate tumor control.

The aforementioned examples given for the past participle are also valid for the gerund. For example:

Late-reacting normal tissues
(normal tissues which have a late reaction);
A robot controls the moving line
(a robot controls the line which is moving)

3. Stacked or Compound Nominal Phrases

In scientific research writing, stacked or compound **nominal phrases** (NPs) have an above-average incidence (Huckin and Olsen 1983, Salager-Meyer 1984, Williams 1984). Huckin and Olsen (1983) rightly point out that the use of NPs promotes concise referencing and discourse cohesion and coherence. In fact, they serve as *ad hoc* names for concepts that will be referred to again, thus avoiding long descriptions. Dubois (1981), in a very interesting article, goes a step further and suggests that various elements of NPs are generally rearranged to construct new NPs and that the choice between the two is not stylistic, but is determined by the writer's assumptions concerning shared information on the part of her/his readers[14].

---

[14] Dubois illustrates this by taking the following example:

[1] Studies of the oxidative NADP in enzymes in Drosophilla melanogaster have concentrated on the relationship of gene dosage to the in vitro tissue enzyme level and on allelozyme variation.

It is possible to rearrange the first NP in the above example in the form of a more complex nominal phrase by changing post-modification phrases into a more concise pre-modification.

[2] Drosophilla melanogaster oxidative NADP-enzyme studies have concentrated on the gene dosage to the in vitro tissue enzyme level relationship and on allelozyme variation.

Dubois (1981) points out that although [2] is more concise, densely packed and hence space-saving than [1], it is less likely to occur in the beginning of a research article, because, in that case, the author will be assuming a lot of information on the part of her/his readers right at the beginning of the article. It appears, therefore, that the scientific writer's use of complex NPs is not static but a dynamic one. S/he creates new nominals as s/he goes on building up new information for the readers.

Generally stacked noun phrases are not made up of more than six nouns. Besides adjectives, the pre-modifying elements of the noun phrase may consist of nouns, adverbs, participles, hyphenated phrases or a mixture of these as the following instances show:

> *antibody-dependent cell-mediated tumor*
> *metastatic androgen-independent prostrate cancer*
> *metformin-associated lactic acidosis*
> *diabetes-related emotional stress*
> *drug injecting behaviour*
> *functional insertion and deletion polymorphism*
> *difficult-to-measure variables*

The type of specification may deal with the material of which an element is made (e.g. *osseous tissue*, i.e. a tissue of bone-like consistency and structure), its use (e.g. *investing tissue*, i.e. a tissue covering or enclosing a structure), its function (e.g. *erectile tissue*, i.e. a tissue capable of erection), and its way of functioning (e.g. *dartoic tissue*, i.e. a tissue resembling tunica dartos in its slow involuntary contractions). Very often stacked noun phrases made up of two short nouns become a single word; at first they are used in the hyphenated form then they are written as a single compound word (e.g. *juguloomohyoid lymph node*, i.e. a lymph node of the lateral deep cervical group that lies above the intermediate tendon of the omohyoid muscle and anterior to the internal jugular vein). In order to decode them it is not sufficient to know the syntactic rules of a language but mainly to be acquainted with the semantic values of each lemma making a stacked noun phrase. It must be noted, therefore, that stacked noun phrases do not necessarily cause problems for the specialist reader.

4. Nominalization

Nominalization[15] is another syntactic phenomenon used in specialized texts[16]. This process consists in using a noun instead of a

---

[15] Bhatia (1993:148) takes up three major types of nominal expressions. The first type is **complex nominal phrases** (Quirk et al. 1982), which is widely used in advertisements of a particular kind. The second type is known either as **nominal compounds** (Williams 1984), or **compound nominal phrases** (Salager-Meyer 1984), and these are typically associated with

verb in order to express concepts related to actions and practices, e.g. *diagnosis* (instead of *to diagnose*).

The reasons why nominalization is very frequent in EMP are as follows:

a) in specialized texts, the derivation of a noun from the related verb appears to reflect the same process of deduction of results from experiments or the same process of derivation of objects from a manufacturing process. An example is the following:

Modifications of the dose of cetuximab were made only in cases of toxic effects to the skin, and modifications in the dose of irinotecan were made in cases of hematologic or non hematologic toxic effects.

b) it puts the concept in thematic position, thus making the communication of information more natural from a condition of new to already known. In addition nominalization makes it possible to emphasize the action expressed by the verb by placing it in thematic position as follows:

Concurrent chemotherapy and radiation has improved the outcome for patients presenting with locally advanced squamous cell carcinomas of the head and neck (SCCHS). These improvements have come at a cost of increased-treatment-related toxicities.

---

scientific writing. The third type is conventionally called **nominalization**, and is overwhelmingly used in legislative provisions (Bhatia 1983). In the present book the expression **nominalization** is used to indicate complex nominal phrases occurring in medical discourse.

[16] Mason (1990) states that nominalization is the major feature of the abstract language favoured by academic writers in general, and medical writers in particular. This phenomenon is called grammatical metaphor by Halliday (1994) because it is a device for packing a great deal of information into fewer words, as processes and properties are reworded as nouns, while "things" become modifiers.

In the second sentence the noun *improvements* refers to the rhematic part of the first sentence expanding it and the stacked noun phrase *increased-treatment-related-toxicities* refers to the previous two sentences (non reported for a question of space) cohesively as the first two sentences deal with adverse effects of chemoradiotherapy.

c) nominalization gives greater objectivity to the author's thought. In Halliday's opinion (1994) "nominalization picks up the preceding argument and presents it in this 'objectified' form as something now to be taken for granted". An instance is the following:

> *The effectiveness of the combination of irinotecan and cetuximab in patients with irinotecan-refractory tumors suggests that cetuximab may circumvent irinotecan resistance.*

This frequent use of nominalization in medical texts implies as a consequence a loss of value of the verb. The latter loses its role and acts as a copula, such that it only links more and more complex stacked noun phrases. Consequently, there is a higher percentage of content words compared to the total number of words in a specialized text. The text becomes denser at the lexical level as the next sentence shows:

> *The complete development of the fracture model requires an understanding of the bond-rupture reaction.*

5. Lexical Density and Period Complexity

From the abovementioned instances, we may affirm that EMP is easier at a structural level and, consequently, that the complexity of their concepts relies on the syntactic and semantic relationships established by stacked noun phrases. With regard to the understanding of a specialized text, even if the structure is simplified, the higher **lexical density** of the sentence and the more complex structure of stacked noun phrases makes its decoding more and more difficult for non-specialists. This leads to the predominance of main clauses at the expense of subordinate ones. The **period complexity** consists in a

specialized period characterized by a great number of non-finite forms, as the following example shows:

Fifty-six percent of patients received more than 90% of prescribed amifostine doses, with chemoRT-related toxicity being the most common reason for withholding the dose (77%).

6. Sentence Length

The length of the sentence is another factor which complicates the comprehension of a medical text. In fact, these texts are structured in periods which are longer than those of common language. This habit is due to the need to include a number of elements so as not to create an information gap or ambiguity. Here is an example:

In order to improve the positive predictive value (PPV) for cancer, predictors of biopsy outcome have been investigated including DRE and TRUS findings and PSA correction methods such as density, velocity, and age-adjusted reference ranges, but none of them has proved useful to select cases for biopsy with an acceptable balance in terms of avoided biopsies versus reduced sensitivity.

7. Use of Verb Tenses and Modality

Salanger-Meyer (1993) has studied the use of **tenses** in abstracts[17]. She has found that the research-type factor is not a discriminating variable whereas the text-type is. Thus, while the past is predominant in case reports and research articles, the reverse situation is observed in review articles, with the predominance of the present tense[18].

---

[17] However, her observation probably applies to other sections of the research article – as abstracts represent the whole text in miniature.

[18] Thomas and Hawes (1994) describe the reporting verbs used in reporting statements, citations, in medical journals and their role in the discourse. The choice correlates with the rhetorical function of the report in which the verb occurs: Cognition verbs (like *believe, hate, know, like, enjoy, understand, want*) with reports of consensus views of the scientific community; Tentative (Discourse) verbs (such as *attempt, desire, expect, plan, try*) with the

Modals are used much more frequently in review articles (17.9% as against 7.7% and 4.8% in the other two text types). The modal verb *may* has the highest frequency. As regards the different moves within each text, the past is found overwhelmingly in the results and in the methods sections (mainly active in the results and passive in the methods), the present is found predominantly in the conclusions as well as in the recommendations which commonly appear at the end of the discussion section. Modals are found above all in the recommendations, followed by the conclusions and the data synthesis.

In a study on **modality** in present-day medical writing, Vihla (1999) has focused on epistemic and deontic modalities, on the certainty of knowledge and the necessity of acting in a particular way in four different genres in recent American medical writing: research articles, editorials, manuals, and popular articles[19]. Her major finding is that modality varies according to the function and pragmatic aim of the genre so that epistemic modality is prominent in research articles, whereas deontic expressions prevail in manuals[20]. The former - epistemic modality - is concerned with the status of the speaker's beliefs and corresponding degrees of conviction, whereas the latter - deontic modality - deals with the speaker's authority in terms of granted permission and imposed obligation.

Webber (2001) has analysed modality in face-to-face interactions at conference and reported that there is a higher incidence of subjective modalization with *I/we think*, items that allow speakers to express a personal opinion with a certain degree of reservation, hence without being too dogmatic or sure of themselves. Moreover, in conference discourse there is a great deal of sifting of evidence, separating what is

---

generalized conclusions of cited studies; and Certainty verbs (like modal verbs or certain other groups of verbs like *doubt, suggest, conclude*) with reports of specific results and findings.

[19] She has obtained the reported findings by using corpus linguistics methods. In particular, she compiled a corpus called *Medicor* containing contemporary medical texts (size 397,311 words).

[20] *May* is the most frequent modal in her corpus. 'Possibility' modals (*can, could, may, might*) are most frequent in popular and professional directive texts, and 'necessity' modals (*must, should*) have the highest frequencies in professional directive texts and editorials. The semantic analysis shows that *may* and *might* are usually epistemic, while *must* and *should* are most often deontic. This difference is also indicated by their collocations.

known from what is as yet uncertain in a terrain which still needs to be explored and mapped out. There is thus even more uncertainty in Webber's spoken corpus, with a higher incidence of *might* than in her written corpus and a lower incidence of *should* for recommendations. The explanations offered for the findings – she states – are even more tentative and speakers do not feel ready to offer recommendations in the same way as published articles do.

The ways for expressing modality are different non only in relation to the genre under study and the channel chosen to communicate (written or spoken) but also in relation to different periods. In a **diachronic study** on medical English, Taavitsainen has demonstrated that Scholastic writings favour prescriptive impersonal constructions and the prevailing modality is deontic[21], whereas experimental essays of the Royal Society are written with subjective epistemic judgement[22]. This is also shown in the semantic types of verbs that reveal the strongest associations with modal verbs in two periods. Late Middle English has mostly action verbs, whereas verbs of mental processes become more common in Early Modern texts.

In conclusion, the modality of scientific texts is related to changing ideological foundations, the institutional and disciplinary context of writing, and the communicative functions of genres within the scientific register.

8. *Use of the Passive and Depersonalization*

Finite verb forms have frequencies of use very similar to common texts, whereas non-finite verb forms occur with double the frequency in specialized texts in comparison with standard English, due to their

---

[21] During Scholasticism knowledge came from ancient authors: Galen, Aristotle, Hippocrates and Arab scientists. What they said was indisputable and their name was enough to guarantee the status of the knowledge.

[22] In the Royal Society period, knowledge is not asserted as received, but it is shaped in the text. In this period, the emphasis shifted from ancient authorities to mental processes and observations as the source of knowledge. The idea was to present the steps of carrying out the experiment in detail so that anyone could do the same; even if scientists could not agree on the causes of nature, consensus could be reached on the processes that could be witnessed by anyone (Dear 1991:161).

ability to make a text condensed and short. But a phenomenon worth highlighting is the **passive voice** use[23]. The frequent use of this form satisfies the need for the **depersonalization** of the discourse by the specialist who is more interested in underlining the effects and results of an action than in stressing who the author of the action is. It is for this reason that the agent is seldom expressed. However, scientific writers do not always prefer impersonal forms. As G. Myers (1989) shows, speakers use the first person as a politeness strategy, to avoid face-threatening acts, and this applies to a slightly lesser extent also to written texts. Hence, expressions such as "we investigated" and "our findings suggest", far from being presumptuous may in fact appear more modest than the corresponding passive or nominalization, which can give the impression that a statement has universal truth value (Webber 1998). There are also stative verbal forms expressing not an action but a condition, a state. Their form is very similar to the passive form but the past participle has more an adjectival function than a verbal one. Some examples are as follows:

> *The system is composed of...*
> *The patients were evaluated...*
> *The data were collected...*

Let us analyse another example:

> *We considered patients eligible if they were more than 18 years of age and had stage IV, histologically confirmed colorectal adenocarcinoma. Other criteria for eligibility were used: a Karnofsky performance-status score of 60 or more; adequate hematologic function (haemoglobin, at least 9 g per decilitre [5.6 mmol per liter]; neutrophil count, at least 1500 per cubic millimetre; and platelet count at least 100,000 per cubic millimetre.*

---

[23] Halliday (1994) has referred to the increasing impersonalization of scientific English and lists "impersonal style" as one of the characteristics of the syndrome resulting in a widespread use of the passive in its typical function in English – that is, achieving a balance of information so that a result or a process is placed in thematic position rather than the actor.

The alternation of active or passive forms cannot be explained in syntactic terms but it depends on complex factors which are pragmatic and textual. At first the authors want to underline their contribution, then they use the passive form to mention the criteria adopted in order to carry out their study.

V. Textual Features of EMP

There are many features that distinguish medical texts also from the textual standpoint. Some of these are characteristics shared by all types of texts but constitute a distinction in quantitative terms.

1. Anaphoric Reference and Use of Conjunctions

Anaphoric reference is a device used to increase textual cohesion. The reasons for its use depend both on the need for extreme clarity and the will to remove all types of ambiguity. However, it is less frequent in specialized texts than in general English: it is normally avoided in favour of lexical repetition.

The need for precision lies at the base of another relevant feature of medical texts, that is, the frequent reference to the parts of the text itself. The function is metatextual - as it refers to the text itself - and specifies a textual element to which it is referred as clearly as possible (see the first example). In other words, it modifies past participles which could otherwise be misunderstood (second example):

In section 21 thereof
The day and the year first above written

Like anaphora, conjunctions have not only a cohesive function but also a pragmatic one as they show the function of the following sentence. For example, after *but, however, on the other hand* the addressee is prepared for a sentence clashing with the previous one semantically as the following instance shows:

Patients with advanced colorectal cancer who receive fluoropyrimidine, irinotecan, and oxaliplatin in combination or sequentially may survive 18 to 21 months. However, once these three standard drugs have failed, there are no accepted treatment options.

2. Theme and Rheme

As for the thematic organization of specialized texts, it consists in alternating **thematic parts** (where the subject is introduced) and **rhematic ones** (showing what is said about the subject)[24]. Often the known/given datum is put in the thematic part. The sequence of thematic and rhematic elements in the sentences assures cohesion and coherence to a discourse. Here is an example of thematic progression:

(i) The simple linear thematic progression
In the past decade, the median duration of survival among patients with advanced colorectal cancer has increased from 12 months to about 18 to 21 months, mainly owing to the introduction of irinotecan and oxaliplatin. Irinotecan and oxaliplatin are widely used…

VI. Text genres

The variety of writings in the medical profession is large, ranging from a single one-page information sheet to a research paper containing multiple pages. The most common types of medical writings are:

---

[24] Kevin Nwogy and Thomas Bloor (1991) investigated the thematic progression in professional and popular medical texts and their analysis shows that in their corpus only the research article exploits all the four thematic progression patterns such as (i) the simple linear thematic progression; (ii) thematic progression with a continuous (constant) theme; (iii) thematic progression with derived themes; (iv) the split rheme pattern. The journalistic report version exploits three (no. (iii)), while the abstract features only two (nos. (iii) and (iv)). This can be explained in terms of the factors of audience, purpose, and context on the organization of information.

Manuscripts: written or typewritten versions of a book or other work submitted for publication.

Journal articles: writings on a specific topic that detail background, methods, results, and conclusions; they usually appear in a newspaper, journal or magazine. They are divided into original, and review articles.

Editorials and letters to the editor: writings presenting thought-provoking alternative interpretations and methodological insights[25]. They may also give testimony to the wit, good humour, and even poetic talent of the medical community.

Reviews articles: these focus on content. Their aim is to present a large amount of information on a subject comprehensively and efficiently[26]. Writers of reviews are often acknowledged as experts in their fields and frequently have conducted research themselves.

Systematic Reviews: these start from a clinically relevant question and highlight this issue on the basis of findings presented in various research articles[27].

Research papers: investigations into a topic to obtain facts and theories.

Case-reports[28]: these are one of the few text genres in medical journals which tells a story[29].

---

[25] Because letters are usually limited to brief reports and preliminary observations, they rarely include detailed methodology. Nor are letters sent out for peer review, as are more substantial works of original research.

[26] Meyer and Freedle (1975) recognize five different schematic ways in which writers organize and readers understand topics in expository texts: collection or list, cause and effect, problem-solution, compare and contrast, description or attribution.

[27] Systematic reviews are distributed in electronic format in the Cochrane database of Systematic Reviews, and instructions on how to write such reviews have been introduced, indicating that the medical community aims to standardize the conventions of this relatively new genre.

[28] According to McCarthy and Reilly (2000) case reports have made a valuable contribution to the advancement of medical science even before Hippocrates.

[29] Papadopoulos (2002) affirms that a case report is generally more interesting than other forms of scientific communication because the human element adds an appeal that may be lacking in other research. Moreover Anwar et al. (2003) advise authors to write it in an interesting manner, which their reader should enjoy.

Case-series studies: descriptive studies that can provide data on the natural history of the disease or offer experience to guide health services. They can give a first glimpse of exciting new findings or demonstrate exceptions to the rule.

Case histories: these include information on how the patient's condition was noticed and diagnosed, how the condition has been treated, and how the patient responded to treatment. The "problem-oriented medical record" favoured by most teaching hospitals today (Weed 1970) organizes this information into four categories, known as SOAP: Subjective (the patient's statement of her/his condition), Objective (the physician's observations of the patient's condition), Assessment, and Plan.

Reports: formal accounts of proceedings presented in details.

Abstracts: short pieces of writing that clearly summarize larger works; they cover procedures, results of studies or experiments, and conclusions.

Value-Added Abstracts: these summarize research articles or reviews written by someone other than the writer of the abstract. They introduce briefly the aims, methods, findings, and include a comment and assessment of the results and their clinical relevance (Vihla 1999: 129-130)[30].

Documents: original written or printed pages that provide evidence or information.

Grant proposals: requests for a sum of money to research into special projects.

Patient Information Leaflets (PILs): these are highly conventionalized directive texts aimed at giving practical, objective instructions[31].

---

[30] Systematic reviews and value-added abstracts mirror a practical need, as medical practitioners may not have time to follow up research done in the various fields of medicine and to compare findings of individual studies, but still require new information in their work. The new genres aim at answering this need, distributing information in a compact form (Vihla 1999).

[31] In her speech at the First Dublin City University Postgraduate Conference in Translation Studies (2004), Cacchiani analysed a corpus of 10 British and 10 Italian PILs from the 1990's, and 10 recently revised Italian PILs which are supposedly clearer and more user-friendly in order to underline the significant differences across languages that can be observed at the structural, syntactic, and semantico-pragmatic levels, primarily motivated by

medical words we use. The origins of clinical and scientific terms can be found in Greek. and Latin myths, in places such as jungles of Uganda and the islands of the Aegean Sea, in the names of medicine's giants such as Hippocrates and Osler, and in some truly. unlikely sources. In this book you will learn the answers to questions such as: •What disease was named for an American space flight? •Do you know the echoic word for elephantine rumbling of the bowels? •What chemical comes from a plant nicknamed "naked lady"? •Can you name the medical word voted into existence in 1910? This item:The Language of Medicine, 11e by Davi-Ellen Chabner BA MAT Paperback $86.00. In Stock. Ships from and sold by "…Yr_Satisfaction_Guaranteedˆ". I bought this textbook for a 'medical terminology' pair of classes, and it's great. The material is clear and easy to understand. There are plenty of exercises to work on to test your knowledge and help you remember more. The site that goes with the book is somewhat limited in its usefulness, especially when compared to wileyplus or the like, but it's better than nothing. The Language of Medicine book. Read 30 reviews from the world's largest community for readers. This market-leading text helps readers understand and lear... Terminology and complex medical processes are described in an easy-to-understand manner that is readily accessible to learners of all levels. This market-leading text helps readers understand and learn complex medical terms by dividing them into their component parts, clearly explaining the meanings of these terms in the context of how the body works in health and disease. Very easy to understand and makes the scary world of medicine a lot easier to comprehend. flag 1 like · Like · see review. Sep 17, 2019 caroline nkobe rated it really liked it · review of another edition. Consequently, it becomes urgently necessary to acquire reading skills and a good understanding of the medical literature in the English language for progressing to the level required for communication with colleagues form the USA, the UK, Australia, Israel and other countries known for their significant achievements in the development of medicine. 1. The doctor who speaks English is better aware of current trends in medicine. Knowing English, you can freely read foreign medical journals, most of the modern books on medicine; get acquainted with publications in the English language on medical websites. In the scientific community, and not only, English is the language of international communication. Introduction to. Medical Terminology 3. 1. Concepts of Medical Terminology 4. Word Parts 5. Combining Forms 6. Word Der Illustrated Medical Dictionary; Essential A-Z Quick Reference to over 5,500 Medical Terms - Dorling Kindersley DK Publishing. 612 Pages·2016·38.02 MB·85,229 Downloads·New! Medical Terminology: A Short Course, 6e. 439 Pages·2011·39.48 MB·4,200 Downloads·New! Quickly master the basics of medical terminology and begin speaking and writing terms almost immediately! Using Davi-Ell Medical Terminology An Illustrated Guide (7th edition). Grasp and retain the fundamentals of medical terminology quickly and easily Don't know a carcinoma from a hematoma? This Medical Terminology Made Incredibly Easy!