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CONTENTS

Foreword

Volume 20 (2009) of the Journal Terminology Science and Research contains four of the papers presented at the panel session organized by Johan Myking and Birthe Toft within the framework of the XVIII European Symposium on Language for Specific Purposes, held 17 – 21 August 2009 at the Aarhus School of Business.

The level of representation is of vital interest to theoretical as well as applied terminology; nevertheless, it seems to have receded somewhat into the background whereas other aspects of terminology have received more attention.

Thus the theme chosen for the panel session was Conceptual representation in terminology across various semiotic systems and media, and the purpose was to shed light on various aspects of the status of the level of representation in present-day terminology. The contributions address the overall topic from various angles, ranging from overall theoretical issues to domain-oriented, analytical problems.

John Humbley gives an account of the overall status of term formation within terminology. He points to the fact that there do not seem to be many attempts at theorizing term formation, asking whether different theories of term formation are compatible or at odds, and claiming that the challenge is to work in different theories as varying aspects of an overarching theory. The contribution discusses various methodological issues, including the use of corpora, and concentrates on setting out prerequisites and methods for all stages of research on term formation as evidenced in texts.

Johan Myking discusses the principle of motivation in term formation. He gives a survey of various attempts to taxonomise motivation and discusses to which extent views on motivation within different trends of terminology might be harmonised. An extended taxonomy of motivation types is provided.

Using Myking's taxonomy as her point of departure, Birthe Toft analyses a number of term pairs resulting from Sundterm, a Danish terminology planning project carried out in connection with the implementation of an American nomenclature of medical terms in the Danish health care sector. The type of motivation of each Danish preferred term as well as the decision process leading to the choice of preferred term is discussed.

And finally, in order to shed light on the natural mechanisms of term formation, Sabela Fernández-Silva, Judit Freixa, and M. Téresa Cabré analyse a set of denominative variants referring to a specific concept in the field of aquaculture, exploring the influence on lexical choice exerted by three factors: the salience of conceptual facets, the language system, and the author's perspective.

We hope – and believe – that the papers presented will contribute to shedding light on some important problems of terminology science, such as:

- How do we cope with different theories of term formation, and what are the possibilities of developing a coherent theory of term formation?
- On what methodological ground should studies on term formation be performed?
- Does an increased interest in term formation contradict the conceptual approach? (research priorities, normative perspectives)?
- Could an increased interest in term formation enhance compatibility between terminological "paradigms"?
- How do we develop an integrative analysis of primary and secondary term formation (e.g. cognitive peculiarities; metaphor)?

Johan Myking
Department of Linguistic, Literary and Aesthetic Studies
University of Bergen

Birthe Toft
Institute of Business Communication and Information Science
University of Southern Denmark

John Humbley
UFR Etudes interculturelles de langues appliquées
Université Paris-Diderot
France

ACCOUNTING FOR TERM FORMATION

Abstract

Although patterns of term formation have long been described in terminology studies, there do not seem to be many attempts at theorizing this question. One exception is that of Rondeau , who proposed a model for what he called neonymy, or terminological neology. More recently, various approaches from both terminology itself and general linguistics have again focused attention on this topic, though in widely differing contexts. The aim of this paper is to identify those theories which contribute to an understanding of how new terms are formed, and to look at ways of integrating them into a coherent approach. Four basic models, or hypotheses of term formation, can be sketched out here. The first, going back to Halliday's work on grammatical metaphor, is that new terms are formed not just in specialised discourse but as a result of discursive strategy. The second, represented in particular in Temmerman's work, is that new terms are essentially metaphors, new ways of approaching specialist knowledge. The third, which Kageura put forward explicitly as a theory of the dynamics of term formation, implies that new terms are constructed on the basis of existing terms. The fourth is that term formation is an essentially diachronic function, and should be studied from a historical point of view, but using all the resources of linguistic analysis. Presented this way, the four models are at odds with each other, and the challenge is to work them in as varying aspects of a single coherent theory. This paper concentrates on setting out prerequisites and methods for all stages of research on term formation as evidenced in texts, focusing on the initial stages of observation and description, with only some brief remarks on the stages of analysis and explanation.

1. INTRODUCTION

After a period of eclipse, the question of how new terms come into being has been approached in an increasing number of publications and from various standpoints, both inside and outside the field of classical terminology. We can point not only to more research being carried out on this topic since the beginning of the twenty-first century, indicating a renewed interest from outside the narrow field of terminologists, but also to several other papers presented in this panel, not to mention related ones proposed in other sections of the Symposium , strongly suggesting that the community of terminologists too is ready to reappraise one of its fundamental issues.

This issue of term formation is only one aspect of the theme of the panel . The representation of concepts encompasses the use of different codes and the relation between concepts expressed in these different codes. It also tackles the question of popularising specialised concepts and the form terms can take in this important form of communication. In this paper, however, the focus is on those linguistic encapsulations of specialised knowledge which are generally known as terms. It will be argued that the way that elements of knowledge are formulated gives insights into the thought processes involved and into the constraints placed on these processes within the community where they are developed. There are therefore both cognitive and social aspects involved, which the linguistic evidence may bring into focus. To these points for study we can add the interest of understanding how terms are formed in unplanned language situations in order to enlighten those engaged in term creation in the context of language planning.

Although the following reflection will be placed within the framework of terminology, it is important to justify developing a particular theory of term formation. The usual criteria of parsimony suggest that if the general linguistic theory of neology is sufficient to account for the formation of words in LSP as well as in the general language, then there is no need for a special theory. Indeed, much work done in terminology over the last twenty years has used the methods of mainstream linguistics, so why should this not be the case for term formation as well?

Part of the answer to this objection lies in the definition which is given to the term itself. A quarter of a century ago, the consensus among terminologists was that terms could be readily distinguished from ordinary words. Building on this supposition, Rondeau was able to say that the neonym or term neologism was as different from an ordinary neologism just as a term was distinct from an ordinary word ("Si l'on considère le néologisme terminologique dans sa spécificité, il se distingue du néologisme lexical de la langue commune aussi nettement que le terme se distingue du mot" Rondeau 1984:122). Many of those working in terminology since then, however, have been quite willing to treat terms as words found in particular contexts, and use the principles of general linguistics to account for them. In this case, such descriptions as those by Tournier (1985) for everyday language may suffice, though as Temmerman (2000: 168-171) correctly points out, while this type of structural analysis is good at assigning categories to neological phenomena, it falls short on the explanation of how and why new terms come into being. In other words, the conceptual dimension is largely neglected, and this has long been recognized as a difference in focus in terminology, when compared to general linguistics.

The specific features which terms possess and which can be claimed to justify special treatment are all connected in some way with the cognitive dimension. The first is that terms are words and groups of words which convey specialized knowledge. Terms are different from other words in that they have to be learnt with a subject, not just with the language. So words denoting colour, for example, are learnt as the native language is acquired implicitly by a child, but words denoting, say, differential calculus have to be learnt explicitly. The need for specialised communication also leads to terms being regulated more specifically than other words, often in the form of standardization, but many other forms too, suggesting that terms undergo different forms of legitimisation (see Humbley 1996). A third specificity may well be the primary nature of the written language in terminology: many terms would appear to be primarily created in the written form. Wüster ([1948] 2001:5) recognised this in particular for abbreviations and acronyms, but the broader question of the medium of creation, spoken or written, warrants further reflection. These specificities should therefore be incorporated into the method: how do terms incorporate specialised knowledge, and what are the constraints that affect their initial creation and dissemination?

It will be argued in this paper that accounting for term formation is more than studying motivation, at least in the meaning that is usually given to motivation. In purely synchronic linguistic studies, motivation is studied from the point of view of the reader, the decoder, the person who tries to construe the meaning of a given and previously unknown term from whatever clues are given by its composition or semantic structure. There is a whole body of very instructive research on this question (cf. Salager-Meyer (1990), Kocourek (1999), Boisson (1996), Thoiron et al. (1996), Myking (1989, 2001) and in the present volume). Our aim is unambiguously diachronic, to document how a term came into being. Motivation is thus relevant in another perspective, not that of the decoder, but that of the encoder(s). This imposes a different, and, we would claim, rather more difficult methodology. Since linguists cannot use their intuition as a decoder to pursue an analysis in LSP, they must rely on documentation which is necessarily fragmentary, since the encoding of the new term goes on essentially in the specialists' minds, and is mediated, though piecemeal, through their writings. This paper's ambition is to give pointers as to how the relevant evidence could be assembled. Of the studies referenced above, only Boisson (1996) and Myking (2001) come close to the aims presented here, but the former, in spite of the historical study of the invention of one particular invention (the slide rule), concentrates on proving the relevance of the archi-concept, whereas the latter is more concerned with secondary rather than primary term formation.

2. BACKGROUND

Before mapping out the prerequisites to a method of research in term formation, we will briefly consider why this issue has been neglected and in the various forms which the new interest has taken. We shall more particularly endeavour to put forward some new hypotheses of term formation, found in this recent research, which will guide the methodological choices to be made.

2.1. Fluctuating interest in new term formation

A careful study of terminology research over the last fifty years turns up relatively few examples of in-depth descriptions of term formation, going beyond typologies. Even the name given to the phenomenon shows considerable variation: in French-speaking countries it was generally equated with neology.

To add to the difficulties in adopting a common metalanguage for dealing with term formation, the words used for discussing the phenomenon are too often loaded, fraught with distracting metaphorical overtones: how new terms come into being sounds like spontaneous generation, how terms are born pays implicit tribute to the idea of the language as a living being. The English expression of coining new terms suggests some sort of authorised materialisation. These distracting connotations may explain why Rondeau (1984) sought to create a new, neutral word, neonymy. This is little used outside francophone circles, and only sporadically there too. Terminogénique was proposed by Portelance (1987: 357) but rarely followed up. In a more global perspective, including a retrospective one which interests us particularly in this context, Møller (1998) suggested *terminochronie*. *Néoterminologie* (Pelletier & Van Drom 2009) is a more recent proposal. *Créativité terminologique* is commonly used in French (modelled on *créativité lexicale*), in particular in language-planning contexts. Term formation is possibly the most used in English (Sager 1989). It has the advantage over term creation in as much as it does not necessarily imply a conscious act. Issues of appropriate metalanguage are not limited to the designation: the scope of the terms can be problematical. It can be argued for example that what Halliday calls *institutionalization* of forms [1] , when they are taken up by the scientific establishment, can be considered as part of the neological process and not separate from it. Similarly, Temmerman (2000:43) simply talks about naming (metaphorical naming is what interests her in particular), a concept which only partly covers term formation. She also occasionally uses neolexicalisation (Temmerman 2000:205), however, indicating a change of focus: from the point of view of the encoder (naming) to that of incorporation in the language code (lexicalisation).

Some reasons for this relative neglect are obvious: the strictly synchronic stance adopted by classical terminology excluded by definition studies of how terms were formed in the past. In addition, neology was practically orientated, with forward-looking language-planning agendas leaving no room for retrospection. One of the first theories of the specific neology of terms was put forward by Rondeau (1984). The main thrust of Rondeau's work was to theorize what was to be done to equip French to become the effective language of the workplace in Québec. The distinction he made between what was later called primary and secondary term formation (Sager 1989) has proved to be of lasting significance, though the relations between the two warrant closer observation. Most of the work carried out in the francophone context has been concerned with secondary term formation, or finding a French equivalent to a concept already named and defined in another language, whereas in this paper the focus is exclusively on the way emerging concepts are named initially.

Research in aspects of term formation tended to dwindle since the heady days of the 70s and 80s, when neology was a frequently discussed topic, at least in French-speaking countries. The reasons for this disaffection are not hard to find, both within and without the area of linguistic studies. Apart from the period mentioned in France during the 1950s to 1970s, neology has not been a major preoccupation in linguistics proper, and is not even mentioned in many textbooks on the subject. And in spite of intense interest in the field in France and Québec, at least during this period, there was little uptake in non-French speaking countries. As far as the extra-linguistic situation is concerned, interest in language planning aspects of neology faltered in France when several articles of the so-called 'loi Toubon ' (1994), initially designed to impose officially authorised neology, were declared unconstitutional.

But new interest, notably in the form of different models, developed in varying contexts and with divergent aims. Some new approaches have emerged, mostly from non-French speaking countries, exploring different aspects with differing aims, meta-languages and results. New interest has been generated by the possibilities opened up by corpus-driven linguistics: not only have the projects using this methodology provided much material which may be used for the analysis of term formation, but they have also fostered a heightened awareness of empirical methods in linguistic description. This has been illustrated notably by Patrick Drouin (http://www.mapageweb.umontreal.ca/drouinp/), and with students who have conducted research under his supervision, notably Annie Paquin, who worked on the neological terminology of terrorism and more particularly Amélie Racine, who extracted neologisms from biomedical texts.

Another strand which has paved the way for interest in term formation is the new interest in term variation. New terms are often formed through variation on existing terms, and work on this aspect has stimulated interest in new terms. Researchers strongly associated with this aspect of terminology are Freixa (2003, 2006), Desmet (2003, 2005) and Condamines (see Condamines et al 2004). Dury and Picton (2009) have recently chosen to group diachronic studies of term formation under the general concept of term variation.

A study of term formation is perforce an exercise in diachronic linguistics, since the focus is on how language forms change and new forms emerge. The exclusively synchronic bent of classical terminology has certainly been a brake on studies of neology in terminology, so the appearance of work on diachronic terminology has had a positive influence here. The work done by Dury (2005) in particular may be viewed as a study of term formation viewed over a relatively lengthy period. This period is even longer for Becker (2004) who takes in not only mathematics throughout the nineteenth century, but also pays close attention to the second half of the eighteenth, though more recently there have been studies focussing on much shorter lapses of time (Picton 2009).

Another contribution can be seen as the emergence of holistic approaches to terminology, which, contrary to the classical theory, embrace both synchronic and diachronic aspects, and which explicitly incorporate a theory of term formation into their approach. This is represented by Garcia Palacios (forthcoming), and, for historical studies, Becker (2005).

Several of the new approaches to term formation contain hypotheses of how new terms come into being, and these need to be sketched out

2.2. Contemporary hypotheses on term formation

It seems quite natural, given the new interest in term formation, that new hypotheses should emerge, to replace the purely descriptive, typological models given by Rondeau for terminology and structural linguists, such as Tournier (1985) for general English. Indeed we claim to be able to identify three or possibly four of these, coming from widely diverging schools of linguistics. We shall sketch out the basis tenants of these new models very briefly, at the risk of charicaturing them. It should be underlined that the models which are presented here are extrapolations from the work of the linguists studied and not presented as such in their works.

As Kageura (2002:32) suggests ("Most studies of terminology have only treated individual terms or a small number of exemplar terms, and most textbooks of terminology fail to bring into the foreground the study of terminology itself"), a theory of term formation should account for all cases studied empirically, so exhaustivity or at least demonstrable representativity will be a requirement of any description.

2.2.1 The discursive model

The first in fact goes back well before the beginning of the twenty-first century, probably to the beginnings of the systemic functional approach to linguistics, and is to be found in M.A.K Halliday's work on (ideational) grammatical metaphor (Halliday 1995). The interpretation which we make of the theory is that new terms are formed not just in specialised discourse but as a result of discursive strategy.

This sort of [specialised] discourse has served well for the natural sciences, where it was important to construe a world of 'things', including virtual entities that could be brought into existence as and when the discourse required them. Some of these virtual entities then remain in existence as theoretical constructs while others function locally in the argument and then disappear. (Halliday 1995/2004: 21).
In this passage, Halliday argues that terms, "theoretical constructs", emerge from scientific discourse embodied in grammatical metaphors and are taken up by the scientific community. These take many forms, but in particular that of nominalisations (the most common form of grammatical metaphor in scientific texts), which serve to "objectify" entities relevant to research, thus the idea of a metaphor, but which is essentially grammatically rendered, by a change in word category.

Except in special cases of designed systematic taxonomies, like those of chemistry, and some in medicine, all grammatical metaphors begin as instantial [i.e. not systematic], created in response to the needs of unfolding discourse. Some of them – the majority in fact – remain this way, being recreated on each occasion. (Halliday 1995/2004: 39).
The discursive model of term formation obviously requires access to research texts in the natural sciences, where scientists discuss their work. Its transposition to other sectors, in particular to technology, and even more so to such disciplines as economics or law, remains an open question.

2.2.2 The metaphoric model

The second model is largely inspired by cognitive linguistics, and is best known in the field of terminology by Temmerman's work (Temmerman 2000 in particular). This theory holds that innovation in the sciences frequently takes the form of Idealised Cognitive Models, new ways of approaching specialist knowledge, and which take the linguistic form of metaphors. It is important to point out that the source of these models is in the scientists' minds.

Metaphorical thinking in the life sciences is demonstrated in the metaphorical models which appear to exist as non-propositional gestalts in the heads of the specialists (Temmerman 2000:69)
This theory suggests that the linguistic evidence simply gives some reflection of this.

Metaphoric models link the language system to the world of experience and to the functioning of the mind. (Temmerman 2000:44)
New terms can thus be conceived as just a by-product of the scientist's intellectual trajectory.

Like the discursive model, the metaphoric model requires of the linguist a thorough reading of the texts to be studied in order to identify and extract the metaphors contained, though attention is focused less on grammatical transformations, and more on the lexical metaphors. It should be pointed out that metaphors are not the only method of naming the new in Temmerman's model. It is shown, for example, how intron and extron were formed on the basis of existing term paradigms (Temmerman 2000:77), and this aspect is taken up specifically in the following model. Temmerman's viewpoint, that "terms [...] link new understanding to previous understanding" (Temmerman 1998:37) holds true in particular for new terms, and finds echos in the other models.

2.2.3 The incremental model

What we call the incremental model, where new terms are formed on the basis of old terms, is inspired by the works of Kageura, who strongly advocates a distinct method of description of term formation:

> A naive study of linguistic aspects of terms on the basis of their factual identity with, or similarity to, words would not be a proper study of terms, but rather a study of lexical items which happens to be based on terminological data (Kageura 2002:1)

He puts forward what he terms a theory of the dynamics of term formation, implying that new terms are constructed on the basis of existing ones, and that these dynamics can be factorized according to the relations between the elements that make them up, and thus calculated.

> intra-term relations are binary [...] intra-term relations are recognised as the status of position of the determinants with respect to the nuclei... "subject specific relations, such as representation , are partially introduced, while many relations are general.' (Kageura 1997:106)

This theory is designed specifically for terms, rather than words of the general language:

> to introduce descriptive mechanisms by which the formation patterns of terms as distinct from general words are properly characterised. (Kageura 1987:110)

This model requires large quantities of material for analysis, and a retrospective dimension, so that the evolution of the terms can be charted, and implies access to the terminology of an entire subject field, such as the documentation, studied by Kageura.

2.2.4 The holistic model

The fourth model is rather different from the first three, in that it does not focus on one aspect of language or one situation of communication, but instead attempts to encompass all relevant aspects of language and communication into an overarching theory . In Becker's work (Becker 2005), the view is

that term formation is an essentially diachronic function, and should be studied from a historical point of view, but using all the resources of linguistic analysis. Garcia Palacios (forthcoming) places his reflection in a contemporary and essentially synchronic framework, but also stresses the relevance of all linguistic models in accounting for terminology and its formation.

Presented this way, the four models are at odds with each other, and the challenge is to test them and to weave their various strands into a coherent theory.

3. METHOD

The methods which have been used by the researchers involved in the elaboration of the four models mentioned above are quite diverse, as has been suggested. The thrust of this paper is to ask questions ton how to achieve the aim of accounting for the formation of new terms. Four classical stages are put forward: observation, description, analysis and explanation. Observation relates to what is to be analysed, and therefore involves the criteria for the choice of a corpus. This is the aspect which will be treated systematically in this paper. Description is a question of how we observe, and how categories may be constituted from the data studied. The analysis phase is where patterns are observed to emerge. The explanatory phase takes the hypotheses enunciated and attempts to determine whether the data confirms the hypotheses or not. These last three aspects will be dealt with more briefly and less systematically, and the points raised are only those in connection with the adequacy of the corpus. The strict division of investigagtory phases ensures a certain granularity of the research. It may, for example, be assumed that it is risky to attempt to infer mental processes from the evidence of new terms in texts. A clear division of the observation and descriptive stages makes it possible to map out regularities or patterns, without projecting cognitive explanations onto the evidence.

3.1. Observation: choosing a corpus to document the appearance of new terms

As we have suggested in the introduction, it seems impossible to envisage any study of term formation by introspection, at least as a linguist. LSP may be thought of as the native language of the subject-specialist, but not of the linguist. It will therefore be necessary to envisage a corpus on which to base the observation. We attempt in the following to identify the principal parameters and to indicate the consequences for the sort of corpus necessary to fulfil the criteria.

3.1.1 Written or oral?

Terms are used in both oral and written mode. The relation between the two should be investigated, as by Weissenhofer (1995:91-92), who found significant differences between the sort of terms used in the two modes, which he characterises in terms of official/jargon, and more recently by de Vecchi (2007). It does seem though that the vast majority of terminology studies in general are limited to the written form, and this is even more the case for term formation, following the supposition that the written mode is primary for LSPs, including term s, contrary to what is observed in the general language, where the oral mode is primary. Similarly, it may be observed that studies of neology in the general language are made from written sources, in spite of the availability of vast oral corpora, at least in English. Part of the difficulty is material, rather than theoretical, as analysis of oral texts is time-consuming, but increasing availability of transcription through speech-to-text may solve this practical problem.

Another solution is an indirect approach, in particular the use of informants, as de Vecchi has done for term analysis in industrial settings, and this sociolinguistic method may be adaptable to research on term formation. The informants can be either “players” interviewed by a linguist, or, in those cases where the linguist also has experience in the sector concerned, we have a linguist-observer. One further avenue of investigation, which de Vecchi has also explored, would be interviews with those directly involved in innovation in the field of interest.

A synthesis of the two modes is suggested in Picton (2009) in the form of a "coconstruction" in which the linguist and the subject field specialist collaborate in interpreting the data extracted from a written source.

3.1.2 Primary or secondary?

Of the four models mentioned in relation to term formation theory, most of the studies they are based on use a primary corpus of authentic texts. The justifications for this choice seem both obvious and convincing. For the discursive model, the hypothesis is quite simply that grammatical transformations take place according to the discursive strategy adopted by the author as the text progresses and that some of these are eventually retained as terms. This means that access to this discourse in texts is essential. It also implies that analysis must take place from a textual point of view, and not simply with what the concordancer gives in the form of lists. This will also hold true when documenting the metaphor model, which posits the metaphor being not just used but actually developed in the text, thus necessitating access to primary texts written by those engaged in the research. As is the case for the discursive model, the metaphoric approach implies identifying discursive patterns, metaphoric or otherwise, as they appear in the unfolding text. The holistic models, in particular those focussing on the history of science or technology, obviously rely on primary sources, as their methodology of historical evidence is that of historians.

One of the models, however (that of Kageura 2002:61 in particular), was elaborated partly using a secondary corpus, i.e. a Japanese dictionary of documentation. The method used in this case requires large quantities of data, which would be impractical in relation to a primary source. The author of this paper has also used secondary sources in the form of terminological dictionaries, with or without a parallel primary corpus, with a view to establishing the basis for an onomasiological approach. The use of an existing dictionary helps to limit the field of investigation to the domain under study, but also contains useful structuring information as to the relation between terms, notably of hyperonymy.

There may well be other sorts of ancillary corpora i.e. other than dictionaries, terminographies or other such compilations. The writings of those closely associated with innovations may also be used to complement research carried out using primary sources. We shall call these tertiary or metaterminological corpora. By studying certain accounts, either avowedly terminological such as that by Seaborg (1994), or those of the history of the innovation, such as Robert Slade (1992), on the discovery of computer viruses, the terminology researcher can obtain relevant information concerning the context and the motivation of the creation at least of highly emblematic terms. The danger is, however, that many other less prominent terms could be neglected in the process, giving a skewed picture of overall term formation in the field considered. It thus appears that secondary and tertiary corpora should be used to supplement primary ones.

3.1.3 How specialized?

The pragmatic considerations of corpus delimitation concern the identification of the type of reader and writer of the texts. Generally speaking, expert-to-expert communication is favoured when it comes to analysing new term formation in the sciences, and the genre most often used is the scientific article, be it contemporary (as in Ormrod 2004) or historical (as in Halliday (1995), or Becker (2005)). The reasons for this focus are obvious: research articles present scientific innovations, which must be encoded in linguistic and non-linguistic forms. A research article is thus by its very function a repository of new terms. The reference to non-linguistic forms of expression of new concepts does not concern us directly here, though it does indirectly, since LSPs are characterised by the interplay of various codes, which may impact on the way new terms are introduced.

The scientific or research article will also play a role in the adoption of new terms, as the new concepts are discussed and modified as they are received into the scientific community, thus mirroring the phase of designational instability generally recognized in general language neology. The difference between the two processes is that on the one hand there is incorporation into the general language community, whereas in the case of new terms, we have a process of scientific legitimisation (Humbley 1996), which results, when successful, in the scientific institutionalization of the term. It should be argued then, that a

substantial co corpus of research articles is necessary for study, and that the focus is not simply on first occurrences, but also on the reception of the new term in the scientific community at large.

Term formation is not the prerogative of scientific fields, however, and a major field of research is opening into neology in industrial and corporate settings. Here the determining parameter is no longer the degree of specialisation but the participation in the activities of the enterprise concerned (Condamines et al. 2004). Parameters will thus vary and include such criteria as – inside or outside the company; the place in the hierarchy which the writer occupies; participation or not in a particular project. This sort of investigation is still very much in the experimental stage and the relevance of the various criteria still largely awaits proof from the practice.

3.1.4 How systematic?

The most systematic corpora used in new term formation come indeed from the field of industry. Condamines et al (2004) take regular samples of corporate documentation. In historical studies (Dury 2005, Becker 2005), criteria are sought to identify and incorporate representative texts of the field to be studied.

Other researchers, such as Halliday and Temmerman, have used what seems like ad hoc corpora, assembled for the purposes of the study. To quote Temmerman (2000:45): "The empirical data we came across [our emphasis] when studying special language texts concerning the life sciences will serve to validate the criticism of the traditional Terminology schools" (our emphasis). This appears to be a theory-driven rather than a corpus-driven approach. Temmerman mentions what she calls a "situational archive", which she defines in the context of her study on the life sciences as "the totality of all the textual material that we came across in our attempt to familiarize ourselves with life science-related subjects in trying to find evidence for our propositions on categorisation and naming in special language." (Temmerman 2000:53).

3.1.5 How big?

Only systematic corpora are defined specifically by their size. Once again, only those projects designed for industrial applications seem to specify the size of the corpus needed.

Other corpora may, however, be just as voluminous, if not more so, for example Becker's academic texts, spread over nearly 150 years. It is unfortunate for us that Becker (2005:116) does not indicate how many words are contained in his corpus, since, as he explains, his aims were not statistical.

On the other hand, some corpora are tiny by comparison, such as Ormrod's (2004:54), which only includes ten articles taken from the one journal (70 000 words).

The requirements of corpus size depend on the aims of the study. In Ormrod's case, the objective was to see how a new term is constructed throughout a research article, which requires a thorough analysis of the article or articles concerned. The result is a model of term construction, which can then be tested in other contexts. The aims of those researchers using vast corpora is to see general movements in vocabulary, in particular new terms coming in, and terms dropping out of the corpus. The need for a very large corpus to gauge this sort of movement is possibly one reason why Kageura (2002) uses a secondary corpus as a starting point, to be sure of having a large enough sample to test his theory of terminology dynamism.

3.1.6 Scope: how far must we go back?

Dury & Picton (2009) give guidelines to building corpora for the study of diachronic term variation (including term obsolescence as well as neology) for relatively limited periods (10 to 30 years). In general language studies, this was theorized by Mair (1997:195) who calls these studies of short chronological periods "brachychronology". This proposal has the advantage of being tried and tested.

What though of the study of how terms came into being within not an institution but a science or a technology? The corpus necessary for this will necessarily be much broader. Becker (2005) takes a periode for mathematics of over 100 years . Research on the formation of the vocabulary of e-commerce, for example, suggests that most of the terms can be accounted for in a very brief period (10 to 15 years) and most of the remainder shortly before. But research on the New Economy shows that some terms can go back more than 100 years; an example of such a term will be given in the next section.

3.2. Methodology

Description is achieved by applying a methodology, which in the case of terminology still warrants discussion. It does not seem unfair to claim that ever since Wüster, terminologists tend to deduce terminological theory from the evidence gathered from one subject field, and apply what has been learnt from this field to others. It is not certain that a description of the terminology, new or otherwise, of the machine tool is directly applicable to different scientific areas, and it is highly questionable whether it can be applied directly to such areas as law or economics. These concerns are just as relevant to term formation as to other aspects of terminology, and possibly more so, since it is important that the actual situation in which terms come into being should be taken into account since this may well vary greatly from one field to another . It is nonetheless imperative to obtain accurate descriptions of terms emerging in a single field in order to proceed to comparisons later, though these comparisons will only be possible if the descriptions have been structured in the same way. For this reason, the questions of the method of description are most important.

Problems of description, once the corpus has been assembled, concern identification of terms and of newness, since the researcher is confronted with the practical problem of isolating what is effectively an innovation. Experience would indicate that there are seldom clear-cut examples of unambiguous first attestations even in highly innovative fields.

The best-known method used for identifying new terms is that of the exclusion corpus: a term is taken to be new if it does not figure in the latest specialised dictionaries on the subject. This method was worked out and used in Québec starting in the 1970s, and figures in Rondeau's handbook (Rondeau 1984:126). It is a highly efficient method of specialised lexicographical updating, but inadequate for the task we are setting ourselves of accounting for new term formation. The absence of a term in a dictionary can after all be put down to many reasons other than that of its newness: differing criteria used for including and excluding terms, use of a dated corpus, even the forgetfulness of the lexicographer.

Indeed, in-depth analysis of an emerging field may well reveal how many of the "new" terms are already used in those fields from which they have been developed. The recently developed field of e-commerce provides a relatively simple example of the sourcing of its vocabulary. If a definition of e-commerce is sought, reference will inevitably be made to a transposition of the methods of commerce to the Internet. The two source domains are thus commerce the Internet. The typical basic vocabulary of e-commerce is therefore constructed with a commerce term, modified by an element indicating the new media: - electronic commerce, e-commerce, cyber bookshop, virtual store... etc. Apart from these core items, the other basic terms go back to those sectors which engendered the new field, in particular those innovations which made the new development possible. It comes as no surprise to discover that the most significant innovations were those made in commerce, the basic source field, notably in distance payment (without distance payment, e-commerce would not have been possible) and in the movement of disintermediation, where the middleman was eliminated. E-commerce made it possible to go much further in this direction than with the information technology of the 1980s. The basic vocabulary of the new domain is thus largely made up of the terms of the "ancestor" fields, and in particular those most recently incorporated. It is relatively easy to track down these innovations, but at the price of broadening the scope of the corpus to include the parent fields.

In addition, the terminology of a new field will inevitably contain many terms which are not new as such, but which acquire an enhanced **significance** in the new field. For example in e-commerce, several expressions such as unwary customer are included. Now it is obvious that this term is not really new: there were unwary customers long before e-commerce took off. Nor has the definition been substantially altered. What then is the neological status of this sort of term? It can be argued that terms like this one have now become central concepts in the field, whereas they were previously peripheral. In this case, they are part of a new organisation of commerce, in particular its security aspects, and thus fit into a new pattern. This indicates the need to have a global view of terms, and to be aware that their newness – or

variation – is itself of a variable nature. Though we cannot speak of lexical newness here, we can observe a shift which should be accounted for. To do so, the corpus should contain a sample of the source field, that of commerce.

Picton (2009:212) has developed tools, both intellectual and IT-based, to characterize this enhanced significance, which she calls "centrality", whereby a concept or set of concepts which were already known in the field prove to be particularly relevant to a new development. It is not term formation as such, but a marker of neologicity, and thus needs to be accounted for.

3.2.1 Dialectic approach

It will be argued here that a method of accounting for term formation must take a dialectic approach, combining semasiological with onomasiological principles. Briefly stated, this will involve treating systematically the terms which are thrown up by the concordancer, and completing by returning to the textual corpus for evidence of how the concepts of the domain are expressed. This means that terms which for any reason are absent from the corpus chosen, yet significant in the field studied, must be included, and the corpus will need to be enlarged in order to accommodate them. Even researchers who reject Wüsterian principals of a primarily onomasiological approach use it in conjunction with semasiology (Temmerman 2000).

A dialectic approach will also mean coming back to supplement the corpus when it is found that a particular area, relevant to the constitution of a particular new terminology, is not (sufficiently) represented. For example in our study of the new economy (Humbley 2005), it became quickly apparent that the initial primary corpus was quite unable to give a representative coverage of the items selected, so an ad hoc scramble ensued for texts to document the terms considered relevant from an onomasiological point of view. In particular the range in dates was sometimes greater than initially expected, in one exceptional case going back to Jevons in the mid-nineteenth century, as is evidenced for the term law of one price. This term, presented as one of the keywords of the New Economy, can in fact be attributed to the British economist William Stanley Jevons (1835-82), who claimed that in an ideal, open market, the prices of the same product or equivalent products tend to be the same: http://www.bernardgirard.com/aligre/euroconso.html

It turns out, when the writings of Jevons are examined, that the economist had himself created a different name for this principles (law of indifference), but in fact uses the formulation of one price in expounding it. It is this discursive formulation which has finished up by being institutionalised.

> The theory really rests upon the principle, which I have called the Law of Indifference, that for the same commodity in the same market *there can only be* ***one price*** [our emphasis] or ratio of exchange.
>
> The necessary result is, that the rate of interest for free capital will tend to and closely attain uniformity in all employments. The market for capital is like all other markets: *there can be but* ***one price*** for one article at one time.[our emphasis] It is a case of the Law of Indifference. (Jevons [1871] 1888: 90)

3.2.1.1 Semasiology: terms as they emerge from texts

The evidence of terms extracted from a corpus with a concordancer is usually the first step in identifying new combinations.

There is currently an opportunity to be seized, as subject-specialised corpora become available for other lines of research in LSP, in particular concerning collocations. The sort of corpus assembled by such researchers as Gledhill (2000) could be used in this way. It would involve taking up the work where corpus linguists, who are generally not greatly interested in conceptual analysis, leave it.

3.2.1.2 Onomasiology: terms identified by their role in a conceptual system

Certain new schools of linguistics have brought the onomasiological approach back into favour. Cognitive linguistics in particular starts off from an onomasiological point of view, as this corresponds to the way a speaker goes about creating a new designation, starting from the concept and searching for an expression, cf Winter-Froemel (2009:97).

Partant d'une approche cognitive, pourtant, c'est cette perspective [onomasiologique] qui s'impose d'emblée, car elle correspond à l'approche du locuteur individuel qui est mis au centre des analyses (Koch 2000 : 79–80, Koch 2003, Koch/Oesterreicher 1996) : celui-ci veut désigner un concept donné – dans le cas des innovations induites par le contact linguistique, c'est le concept désigné par une certaine expression de la langue source – et, pour ce faire, il cherche une expression adéquate dans la langue cible.
To account for the new terms formed, one can start from a conceptual sketch of the elements to be named. Onomasiological investigation of the components of the new field will produce a division into sub-fields, which often correspond to chronological periods, similarly to geological layers. For the field of e-commerce, for example, it turns out that the new domain is primarily formed by transferring classical or innovative business practices to the Internet. The primary source of the new terminology is then the interaction of these two fields. But they themselves have itself some immediate sources: notably distance payment and associated security issues, themselves developed just before the appearance of e-commerce. The method of accounting for the totality of the new terms in the new field depends on identifying its constituent fields.

This method is not necessarily mechanically applicable to all fields. For example, a study of the first texts on sound recording reveals the presence of a "writing" metaphor. Recording sound is equated with writing. This is developed into a whole scenario, strongly suggesting the mapping of cognitive metaphor studies. But can it be claimed that this metaphor is not peculiar to recording sound, since it may well go back to an earliery technology, that of photography, where the metaphor of writing is also used. In other words, is this metaphor a case of a relatively primitive analogy, i.e. with writing itself, or does it go back much less further, that is, only to the immediately preceding technology (Humbley 2009)?

3.3. Analysis

When the emerging terms are identified in the texts, they should be analysed within the framework of the four theories . We have attempted to do this in the analysis of the two emerging terminologies already mentioned: that of the new economy (Humbley 2005) and that of e-commerce. An independent, onomasiological definition of the corpus was adopted, in order to obtain exhaustivity within the framework as defined. In the case of the new economy, we took the hundred entries of the Encyclopedia of the New Economy by subject field specialists and in fact direct participants in the field, and for e-commerce the nomenclature of the Canadian dictionary, Vocabulary of E-commerce (Charette 2002). However, the results obtained are messy in both cases, largely because the corpus used to study the exemplification of the terms was insufficiently well characterised, and therefore inadequate for reliable results. Though certain insights were gained from the imperfect corpus, it may be assumed that the applications of the criteria enumerated in 3.1 would go a long way to providing a more solid basis for analysis. These would include an adequate documentation for the subject fields or fields of activity which contributed to the constitution of the terminology in question. For e-commerce, for example, this would entail a representative corpus on electronic payment and disintermediation from the years immediately preceding those under study. Some of these issues are discussed below.

3.3.1. Confronting evidence with the models of term formation

As we have seen in the previous section, the four theoretical models which we invoke were worked out in different contexts and with different aims in view, and they are not necessarily compatible as presented in their original contexts. But all need textual evidence. Kageura (2002) proposes a detailed method for identification of term dynamics, but unless we have access to source texts, we cannot document how this form of term formation actually takes place.

In Ormrod's research (Ormrod 2004), a parallel is sought with the elaboration of the scientific concepts and the dynamic construction of the text itself, implying a linear study of how the elements of what may become a new term are put together as the article itself unfolds. These constructions are held to be either "advance"when they announce a coming term, or retrospective, when they bring together elements already presented into one new term, according to their placing in the text. Bboth are highly indicative of incipient termhood. But Ormrod's work suggests compatibility of the discursive and the incremental model: the incipient terms are worked out in discourse, but are demonstrated to be built on existing terms.

3.4. Empirical testing

Once the new terms have been identified and classified in their appropriate contexts, as suggested in 3.3, the comparison with the theories can be made .

3.4.1. Conformity with or divergence from models

The study of the new terms of a field will typically give bundles of terms which can be said to conform to one or other of the models postulated. On the one hand, certain models will turn out to be frequently used to create new terms, and others very little. For e-commerce, most of the basic terms, as we have already suggested, correspond to the incremental model and constitute a paradigm for which the term e-commerce itself could be said to be the class leader. A large number of terms contained in the Vocabulary of E-commerce are formed on the same model (cyberstore, electronic). The division of the vocabulary into chronological layers suggests that this model may well have been already used in distance payment, where the same paradigm is used.

The need to subject the items under analysis to a complete study in a global context seems clear. The example of phonograph, according to a purely typological analysis, would traditionally be characterized simply as a learned form, a throwback to Greek to express a new idea. But a study of the pioneering texts of sound recording illustrates clearly that the choice of the classical roots was made in accordance with an underlying metaphor. A comprehensive study shows that the metaphor of writing was part and parcel of the process of inventing: we can posit and verify scenarios based on this model (RECORDING SOUND IS WRITING) in these first texts. So the use of -graph is not isolated: it was used because 19th century scientists still used Greek and Latin for deliberate naming, but the metaphor was already there. So just labelling phonograph "learned form" is not accounting for how it came into being. The "learned form"It needs to be confronted with other models of term formation.

4. SUMMING UP AND LOOKING FORWARD

The points made above as to the criteria used to establish a corpus which can give valid evidence to account for term formation are largely the result of experience gained from only partly successful attempts to document the emerging terms of a new field. The relevance of all four models would appear to be established, since each accounts for some aspect of term formation, and ways in which they can be reconciled are suggested. The result is not yet a unified methodology, but points this way. We conclude here by indicating some of the new opportunities which should be seized in order to explore the question of term formation more meaningfully.

One of the main obstacles to studies of term formation, the diachronic approach which we adopt, has been the difficulty in obtaining corpora which are adequate in both quality and quantity. This situation has certainly changed more swiftly in the industrial sector than in the scientific, since companies store their documentation systematically, and some enlightened ones call on terminologists to access knowledge from within these holdings. This is indeed how such research on diachronic terminology began. But in the scientific sphere too, historical texts have become increasingly readily available, as Becker (2005) attests, and as we have found for the history of recorded sound. With the increasing availability of corpora, it is more and more important to know how to extract relevant data; thus the relevance of methodology.

Not only are more corpora becoming available, but more and more linguists, outside the narrow field of terminology, are exploiting them with other aims in view. Foremost among these, as far as accounting for term formation is concerned, are those studying phraseology in specialist fields. According to the discursive model of term formation, terms are made as the text unfolds, and are characterized by the phraseology used. Fortunately for terminologists, phraseology is one of the topics which has attracted the most attention, as may be gauged from Gledhill (2000) and Tutin (2007).

Linguists are not the only ones to home in on increasingly available corpora: historians too – in particular those interested in the history of science and technology – are eagerly working through these texts, and their work can be of great use to the term historian, as we have found out in the study of how the terminology of sound recording developed. But by the same token, the evidence turned up by linguists has been found useful to historians, indicating that fruitful collaboration is overdue.

1This appears to be a different use than that popularized by Bauer (1983:42-50), where institutionalization was seen to precede lexicalization, though both highlight the social dimension, and closer to that used by Myking (1989:270), in a specifically terminological context.

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Sabela Fernández-Silva, Judit Freixa & M. Teresa Cabré
Institut Universitari de Linguística Aplicada (IULA)
Universitat Pompeu Fabra
Barcelona, Spain

MULTIPLE MOTIVATIONS IN THE DENOMINATION OF CONCEPTS: THE CASE OF "PRODUCTION AREA" IN THE TERMINOLOGY OF AQUACULTURE IN FRENCH AND GALICIAN1

Abstract

Terms are par excellence the most prototypical units of the representation of concepts, through which special knowledge is commonly represented, transferred and understood. Although terms are linguistic signs, which have been said to be arbitrary as far as the relationship between form and meaning is concerned, their relationship with the concept can be seen as a motivated one, since part of the content of the concept may be displayed in the term. When the concept-term relationship is examined in real communication contexts, concepts are often expressed via several motivated terms, some of which exhibit different facets of the concept and show a particular vision of it. This phenomenon of denominative variation present in specialised texts reveals that the motivation underlying term formation is not unique but may, on the contrary, be multiple. In this paper the set of denominative variants referring to the concept PRODUCTION AREA found in a bilingual (French and Galician) corpus of texts from the field of aquaculture are analysed to shed light on the natural mechanisms of term formation that are used out of regulated contexts of standardisation. The influence of three factors in lexical choice will be explored: the salience of a particular pattern or facet according to the concept class, the role of the language system in naming and the role of the author's perspective.

INTRODUCTION

Terminological units are the most prototypical units of representation of specialised concepts. Amongst the various types of representation used by experts to convey special knowledge, such as images, formulas or other non-linguistic symbols, terms are linguistic signs, i.e. intrinsically arbitrary entities made of two components: form (signifier) and meaning (signified). Although the arbitrariness of the linguistic sign is commonly accepted as far as the signifier / signified relation is concerned (Saussure 1916), terminological units have been characterised as motivated (Kocourek 1991; Sager 1990, 1997) since term formation is often described as a conscious and deliberate process aimed at establishing a quick and straightforward reference to the concept being named. Therefore, motivated terms such as morphologically complex terms appear to be the most adequate type of units in terms of their communicative effectiveness because they not only represent the concept globally but also display part of the content of the concept in their form.

When the behaviour of terms is examined in real communication contexts, we observe that the same concept is often expressed by more than one (motivated) term in texts produced by experts. In some cases, these denominative variants are not only formally different, but also semantically different: they display a different facet of the concept, each of them showing a particular vision of it (Freixa 2002). The choice of these terms has a significant cognitive consequence, because it affects the way the recipient accesses the concept. We believe that this phenomenon of denominative variation, which was characterised as a perturbation of the terminological unit that hampered communication among experts (Wüster 1979), is not a "random act of defiance or carelessness, but one which is well motivated and useful in expert discourse" (Bowker 1998: 487).

The aim of this paper is to explore some factors that have been studied in the literature in relation to term formation to explain the conceptually-motivated behaviour of denominative variation. First, we wish to examine the relationship between denominative variation and the internal structure of a concept by determining whether there are some facets that are more salient than others for a given concept class (Geeraerts et al. 1994; Geeraerts 2000). Second, the role of the cultural system will be assessed by exploring the different motivations in French and Galician (Diki-Kidiri 2008). Finally, the role of the

context will be explored by examining the effect of the author's perspective on term choice (Fernández-Silva, Freixa & Cabré 2008). In order to do so, we will analyse the set of denominative variants referring to the concept of PRODUCTION AREA from a corpus of texts on aquaculture in Galician and French.

The paper is structured into three main sections. In section 1 we develop our ideas about the motivational processes of denominative variation and we expose some theoretical considerations about the concept and the terms which allow us to explain the flexibility of the concept-term assignment. In section 2 we describe the corpus and the methodology of analysis. Finally, in section 3 we observe the effect of the onomasiological salience, the cultural system and the sender's perspective in the denominative choice by looking at the occurrences of the concept of PRODUCTION AREA in context.

1. DENOMINATIVE VARIATION WITH COGNITIVE CONSEQUENCES

The study of variation in Terminology has experienced a great shift since the beginning of the discipline. The prescriptive perspective adopted in the General Theory of Terminology (Wüster 1968, 1979; Felber 1984), aimed at standardizing concepts and terms in an international context, led to the belief that all kinds of variation affecting the terminological unit hampered specialised communication. They violated the principle of univocity which established that a concept should be designated by only one term and a term should be assigned to a single concept. Therefore, terminological variation was disregarded at the theoretical level and banned in the standardising terminological practice.

> Depuis quelque temps, nous assistons aux progrès continus d'un mal pernicieux qu'on pourrait appeler la 'désintégration linguistique'. Dans tous les pays industrialisés, le langage technique change, et cette évolution n'est pas seulement fonction du cours du temps, mais dépend aussi bien de la région géographique ou du milieu social auxquels appartient celui qui parle ou écrit (savant, ingénieur, ouvrier, par ex.), quand ce n'est pas tout bonnement de ses connaissances ou de ses goûts personnels. Il est évident que ce phénomène empêche les techniciens et les gens de métier de se bien comprendre, déjà, même, lorsqu'une seule langue est en cause. C'est pourquoi, depuis plusieurs années, des associations officielles ou semi-officielles, dans nombre de pays, se préoccupent de rationaliser les notions techniques et leurs appellations (...) des experts qualifiés d'une technique donnée mènent des travaux en vue de déterminer quelle définition et quelle appellation doivent être attribuées à toute notion appartenant au domaine technique considéré. On obtient ainsi, pour chaque notion, une définition normalisée et un terme normalisé dans chaque langue. (Wüster 1968: 2.9-2.11)

However, in the past two decades, Terminology has widened up its scope of research and has turned towards the description of special language in different communicative contexts. Several theoretical proposals have appeared from different branches of knowledge –the social sciences, the communication sciences and the linguistic sciences –in response to the necessity of overcoming the universal application of the prescriptive paradigm (Cabré 2003). A general claim in all these proposals is that variation is a typical feature of special language and that it can be functional in expert communication (Cabré 1999; Temmerman 2000; Gaudin 2003; Diki-Kidiri 2008).

> Variation is inherently paramount in every communication process. It may be realised through alternative denominative forms for the same meaning (synonymy) or through the multiplication of meanings for a single word-form (polysemy). This principle is universal for terminological units, although it admits different degrees depending on the circumstances of every communicative situation (Cabré 1999: 85) [2]

The use of alternative denominations to refer to the same concept is known in the Terminology literature as denominative variation. We understand denominative variation as a phenomenon of lexical variation, since in our approach denominative variants are only terms, i.e. "lexicalised forms, with a minimum of stability and consensus among the users of units in a specialised domain" (Freixa 2006: 51). Despite being generally considered a phenomenon of formal variation (affecting the formal side of the terminological unit), the use of different variants can also entail a meaning modification that has a consequence in the way the concept is perceived by the recipient. Therefore, we think it is important to distinguish between two kinds of denominative variation, as illustrated in table 1. [3]

	conceptual realm	linguistic realm		examples
denominative variation **without** cognitive consequences	one concept	several terms	different form	*marine product / sea product*
			same meaning	
denominative variation **with** cognitive consequences	one concept	several terms	different form	*marine product / fishing product*
			different meaning	

Table 1: Two subtypes of denominative variation according to the cognitive consequences

In the first situation, a concept is expressed linguistically by several terms that are formally different but have the same lexical meaning. As we can see in the examples from our corpus (see section 2), marine product and sea product are strict synonyms, since the characteristic selected in the modifier to distinguish this product from others is in both cases the origin, i.e. the sea. The choice between these two terms has no cognitive consequences whatsoever because both variants convey the same information about the concept. However, there is also the situation whereby the denominative variants are not only formally different but also semantically different. Sea product and fishing product do not have the same meaning despite referring to the same concept because each variant highlights a different characteristic of the concept, namely, the origin of the product and the activity performed to obtain it. In this case, denominative variation has cognitive consequences, because the use of a particular variant has an effect on the way the recipient understands the concept. Furthermore, it seems logical that the choice of one term or the other by the sender could also be motivated, consciously or unconsciously, depending on the characteristic the sender wishes to emphasise in a specific situation.

1.1. Flexibility of concept-term assignment

The acceptance of the existence of denominative variation with cognitive consequences is possible today thanks to the theoretical contributions of current descriptive approaches to Terminology. A flexible conception of the concept-term assignment, which can vary according to contextual factors, is necessary in order to accept that a special concept can be expressed by several terms conveying different meanings. The insights about the flexibility of concept formation and structuring formulated in cognitive linguistics (Lakoff 1987) had an impact on the conceptual theory of Terminology (Zawada & Swanepoel 1994; Temmerman 2000; Faber et al. 2005) and consequently concepts are no longer described as objective and clear-cut entities. Similarly, the linguistic nature of terminological units is now unquestionable (Cabré 1999) and this translates into variability both on the semantic and formal level.

The characteristics of specialised concepts in the light of current approaches can be summarized as follows:

- Scientific categories are culturally, bodily and perceptually based, as is true of general categories. Scientific thought is the result of human experience and our instrument of perception, the body, imposes a meaningful structure upon experience (Zawada & Swanepoel 1994).
- Special knowledge is produced by a scientific community that is situated in a cultural, temporal and socio-professional context. Depending on the subject field or the school of thought, the same reality can be perceived and structured differently, giving rise to different concepts (Zawada & Swanepoel 1994; Gaudin 2003; Diki-Kidiri 2008).
- Categories are not understood independently but in their interrelation with other concepts within frames or Idealised Cognitive Models. Conceptual structuring can vary according to the frame or ICM within which a concept is categorised (Temmerman 2000; Faber et al. 2005).
- The content of the concept is not just the definition made in terms of necessary and sufficient conditions. Indicating the position within a logical or ontological structure plus the distinctive features is not always enough to understand a category, and depending on the type of category other information might be essential (Temmerman 2000).
- The knowledge structure of a subject field is dynamic and changes through time; the relations among concepts are multidimensional and its complexity can vary according to the needs in a particular situation (Cabré 2003; Rogers 2004).

Concerning the terminological units, we support the principles of the Communicative Theory of Terminology (Cabré 1999; 2003; 2008), which describes the term as a three-component unit:

The multifaceted terminological units are at one and the same time units of knowledge, units of language and units of communication. Based on this approach, the description of a terminological unit must necessarily cover these three components: a cognitive component, a linguistic component and a sociocommunicative component. But this triple composition of terminological units does not show them to be different from other units of language such as words or lexical units in general usage. (Cabré 2003: 183)

- Terms are units of thought because they are the linguistic representation of a concept, the counterpart in the linguistic realm of a concept belonging to the conceptual realm. Their content is primarily determined by the position of the concept within the conceptual structure of the field, and it is codified by the expert community.
- Terms are units of language, i.e. linguistic signs with lexical meaning. They occur naturally in special texts and they bear syntactic and semantic relations with other linguistic elements.
- Terms are units of communication because they appear in specific communicative contexts. Their form and content accommodates to the situation within which the discourse is produced.

Concerning the concept-term assignment, we support the idea that terminological units are motivated by the concept, and we agree with Guiraud who says that "la prédominance du motivé est si prononcée qu'elle est un caractère essentiel de la formation terminologique" (Guiraud 1978: 98). This assumption in the field of Terminology is supported for two primary reasons. The first reason, of a cognitive nature, is related to the specific function of term formation in special language, which is aimed at ensuring and increasing the effectiveness of specialized communication (Bowker 1998). In situations where new knowledge is created in a natural environment, as opposed to the artificial environment of standardising organisations, "designation is carried out by individuals who in their work need to name new concepts, to represent as precisely, appropriately and economically as possible the results of their observation and conceptualisation so that others can understand them" (Sager 1990: 287). Therefore, motivated terms are an access door to the understanding of concepts, since they permit the concept to be quickly and efficiently identified.

The second reason that explains the motivated nature of terminological units is related to the specific methods of term formation, in which the proportion of multiword terms is higher than in general language (Collet 2004: 105). Multiword terms are motivated because, in Kocoureks's words (1991: 172), they not only designate the concept globally but also display some of its specific characteristics in their form. Most term formation processes lead to motivated terms, as can be seen in the following table: [4]

motivation	term	Definition
morphological	élevage	1. Action de prendre soin d'un animal et de l'élever jusqu'à ce qu'il atteigne la maturité. [FAO aquac. glossary]
syntagmatic	Public Maritime Domain	1. Seas or ocean areas owned by the state as opposed to individuals or corporations.
semantic	sea water	1. The water of the sea, or water taken from the sea. [Oxford English Dictionary] 2. Coastal and offshore waters in which the salinity is maximal (around 35 ppt) and not subject to significant daily and seasonal variation. [FAO aquac. glossary]

Table 2: Motivational processes of term formation

Terms like élevage and Public Maritime Domain are motivated because each component stands for a part of the concept's content, as can be seen in the definition. Another common method of term formation leads to semantically motivated terms, like sea water, which designates a specific concept of aquaculture that, however, results from a specification of its meaning in general language.

1.2. Motivation of denominative variation

If we accept the motivation of term formation, the fact that a term is a linguistic crystallisation of the concept's most relevant characteristics, why should the behaviour of denominative variation be arbitrary? We believe that denominative variation in texts can in some cases be explained as the result of a multiple motivation that takes place in the naming process (Freixa, Fernández-Silva & Cabré 2008).

The flexibility of concept structuring, as we pointed out before, lies at the root of this phenomenon. For this reason, on some occasions, univocity might not be the desired situation. If the concept is a flexible entity within a multidimensional concept system that can vary in respect of functional and contextual factors, it may occur in texts through different terms with different lexical meanings depending on the parts of the concept that are desired to be emphasised in a specific situation. A concept can be expressed by a single term, or by several terms that convey the same meaning, but in the cases when a concept is expressed by variants differing on their lexical content—the denominative variation with cognitive consequences mentioned above—each variant showing a different point of view, expressing different facets or dimensions of the concept, it is logical to presume that there is a cognitive motivation behind it, a slight variation in the understanding of the concept that motivates the user of the terminology to choose a specific denominative variant:

> When writing a specialized text, a subject field expert who wants to express ideas using pre-existing terms and concepts may face a number of difficulties. For instance, on the one hand, the notion that the expert wants to express may be slightly different from the concepts denoted by the terms that he or she knows. On the other hand, the expert may know the correct terminological expression for a precise concept, but he or she may intentionally wish to express a slight shift in the meaning of this concept. (Bowker 1997: 277)

Although some studies have shown that denominative variation is in many cases unconscious (Freixa 2005), we support the idea that not all variation can be attributed to carelessness or arbitrariness on the part of the subject field experts. Furthermore, we believe that if we examine the behaviour of terms in real discourse, in relation to the context-related factors that could motivate term choice, we will be able to find out the patterns and regularities hidden behind such apparent randomness and provide a satisfactory explanation of the behaviour of denominative variation.

Our hypothesis is that the choice of a term to express a specialized concept is determined by factors that are situated at the level of the system of terminology, but also by factors at the level of use. The characteristics of the concept being named within the concept system and the particularities of the language that is employed are factors belonging to the system; but concept naming is also affected by contextual factors that are specific to the situation from which a concept is approached at a particular moment. The effect of some of these factors will be explored in section 3. We wish to reproduce the words of Kageura (2002) in which this idea of terminology standing between two forces is also expressed:

> The fact that terms are located within the tension between the need for efficient communication and the requirement of representing the concepts of a domain makes terminology somewhat unique as a linguistic phenomenon. To the extent that the functional requirement of terminology is to gain the precision necessary for expressing restricted meaning, terminology tends towards stronger systematization of its internal structure [...]. At the same time, to the extent that terminology shares its linguistic form with the general vocabulary, it tends towards using the full flexibility of natural language, not only in its lexical-formal dynamics but also in its capacity of establishing dynamic relations between lexical items and meaning. This dynamic force, inherited from natural language, is strengthened by intersecting with general-language words in real discourse. (Kageura 2002: 15)

2. METHODOLOGY: CORPUS-BASED ANALYSIS

For this study we have analysed the different denominative variants of "PRODUCTION AREA" extracted from a corpus of texts on aquaculture in Galician and French. The corpus of 323,208 words consists of 40

texts of different types and levels of specialisation – 21 in French and 19 in Galician—treating different aspects of the aquaculture activity from different perspectives.

A production area is defined in the European Legislation 5 as "any sea, estuarine or lagoon area containing natural deposits of bivalve molluscs or sites used for cultivation of bivalve molluscs from which live bivalve molluscs are taken" (Council Directive 91/492/EEC: 3). It is a concept restricted to shellfish aquaculture, which is a very important maritime activity in Galicia (NW Spain), as well as in some regions of France (mainly on the Atlantic coast). Spain and France are the two biggest shellfish producers in Europe. 6

After comprehensive reading and text exploration with the help of concordance software (TextSTAT), a total of 26 denominative variants—14 in French and 12 in Galician—and 218 occurrences for this concept were detected. The conceptual equivalence was validated by subject field experts 7 and the information was stored in a database.

language	denominative variants	freq occurrence	number of texts
French	bassin conchylicole	13	7
French	bassin de production	7	3
French	espace conchylicole	2	1
French	espace de culture	1	1
French	secteur d'élevage	2	1
French	site d'élevage	3	2
French	site de production	2	2
French	zone conchylicole	10	5
French	zone d'élevage de mollusques	1	1
French	zone de culture	1	1
French	zone de production	64	8
French	zone de production conchylicole	6	4
French	zone de production de coquillage	1	1
French	zone de récolte	7	1
Galician	área administrativa de producción	1	1
Galician	área de explotación	2	1
Galician	área de producción	17	2
Galician	zona administrativa de producción	2	1
Galician	zona de cultivo	3	3
Galician	zona de cultivo e marisqueo	1	1
Galician	zona de marisqueo	1	1
Galician	zona de producción	57	6
Galician	zona de producción de bivalvos	1	1
Galician	zona de producción de moluscos bivalvos e outros invertebrados mariños	7	2
Galician	zona marisqueira	4	3
Galician	zona productiva	2	2
	TOTAL FREQUENCY OF OCCURRENCE	218	

Table 3: Denominative variants, frequency of occurrence and distribution in the corpus

After storing all the terms, occurrences and information about the texts in the database, we proceeded to the semantic analysis of the denominative variants. For that purpose, we adopted the methodology used in Kageura (2002) to describe the conceptually motivated patterns of term formation in Documentation Sciences. The purpose of Kageura's analysis is to detect the regularities in the construction of the totality of terms of a given subject field, but we think it can as well be useful to grasp the systematicity in the behaviour of term variation. The aspects under observation are the relationships between terms and their constituent elements and the relationships among the constituent elements interpreted as combinations of concepts within the overall conceptual system of the domain. The methodology consists of the following steps:

1. The concept is analysed within the specific concept system of aquaculture in order to determine on one hand its position within the conceptual structure and on the other the concept class it belongs to (the four main concept classes being entities, activities, properties or relations).
2. Each denominative variant is decomposed into head and modifier, and the constituent elements of each element are identified.
3. The conceptual class of each constituent element within the conceptual system is identified –as we had previously done for the concept itself.
4. The dependency relation existing between the concept at the head and the concept at the modifier is established, so as to determine the intraconceptual relation expressed in the term.

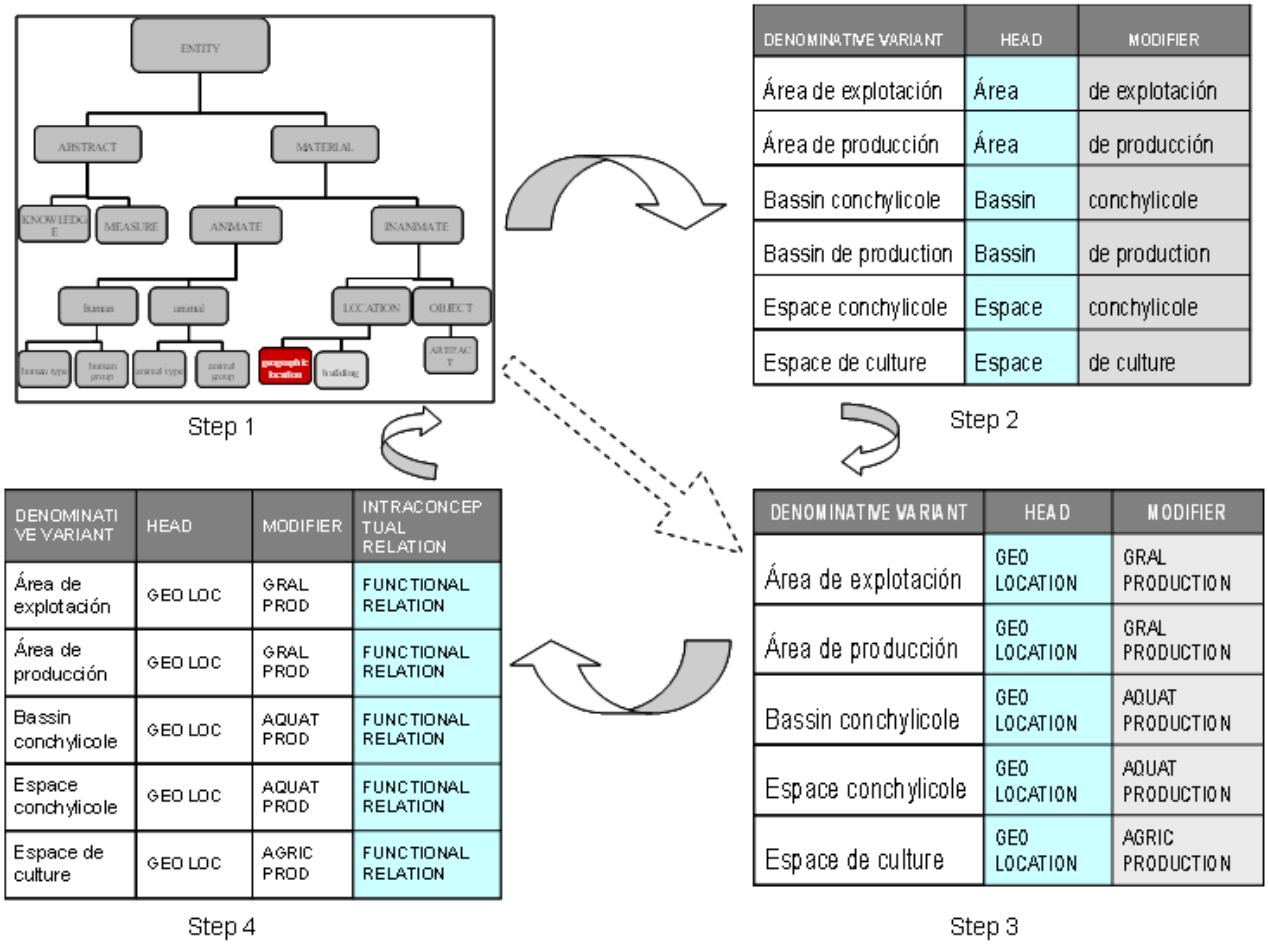

Figure 1: Methodology of analysis of conceptually motivated patterns of term variation

3. ANALYSIS: DENOMINATIONS OF "PRODUCTION AREA" IN AQUACULTURE

According to the methodology described in the previous section, PRODUCTION AREA can be classified within the conceptual system of aquaculture as a concept of geographical location which is one of the concepts of general location, which is in turn classified within the broader concept class of inanimate material entities.

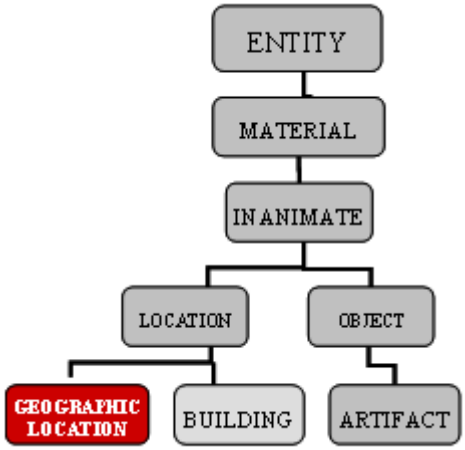

Figure 2: Concept classification of PRODUCTION AREA

Structurally, all denominative variants are compound terms with the structure N + PP (e.g. zona de producción), N + Adj. (e.g. zone productive) or N + Adj. + PP (e.g. zona administrativa de producción). More variability is found within the structure of the prepositional phrases, as can be seen in table 4, where the whole list of morphological patterns along with their frequencies is shown:

structure	example	n° variants	%
N + A	bassin conchylicole	5	19,23
N + A + PP[P + N]	área administrativa de producción	2	7,69
N + A + PP[P N C N]	zona de cultivo e marisqueo	1	3,85
N + PP[P N P N]	zona de producción de bivalvos	3	11,54
N + PP[P + N]	área de producción	13	50
N + PP[P N A]	zone de production conchylicole	1	3,85
N + PP[P N P N A C D N A]	zona de producción de moluscos bivalvos e outros invertebrados mariños	1	3,85
	TOTAL NUMBER	26	100

Table 4: Morphological structures of denominative variants and frequencies

With regard to the constituent elements in the head position of the term, we have documented 6 lexical items 8 –zona and área in Galician and zone, secteur, espace, bassin and site in French — all of them designating concepts of general geographical location. In two cases, only in Galician though, they are complemented by the specification of the agent, i.e. the administrative body that is responsible for the demarcation of that area: zona administrativa and área administrativa:

conceptual pattern		
main conceptual class	**subspecification**	**lexical categories**
GEOGRAPHIC LOCATION		zone / zona; área; secteur; espace; site; bassin
	+ BODY	área administrativa zona administrativa

Table 5: Conceptual patterns of constituent elements in head position

The constituent elements in the modifier exhibit more variability. This is not surprising, because the head often indicates the concept class to which the concept belongs, and no high degree of variation is expected among the lexical items used to designate the same concept, as some authors have pointed out (Freixa 2002). We observe that all elements in the modifier select concepts of productive activity, the difference being in the degree of specification of that activity: general production concepts like production or exploitation, agriculture production concepts –culture, élevage —or aquaculture production concepts like marisqueo or conchylicole. Besides, in some denominations, the general production and agriculture production concepts add a subspecification that restricts the scope of the productive activity to the domain of aquaculture, either by means of a concept of aquaculture production — production conchylicole, cultivo e marisqueo — or by mentioning the object of the productive activity, i.e. the shellfish. The denomination of the animal being cultivated yields important lexical variability, because it is named according to different biological classifications: coquillage, mollusques, bivalvos, moluscos bivalvos e outros invertebrados mariños.

conceptual pattern		
main conceptual class	**subspecification**	**lexical categories**
GENERAL PRODUCTION		de producción / productiva / de production de explotación
	+ ANIMAL	de producción de bivalvos de producción de moluscos bivalvos e outros invertebrados mariños de production de coquillage
	+ AQUACULTURE PRODUCTION	de production conchylicole
AGRICULTURE PRODUCTION		de culture / de cultivo d'élevage de récolte
	+ ANIMAL	d'élevage de mollusques
	+ AQUACULTURE PRODUCTION	de cultivo e marisqueo
AQUACULTURE PRODUCTION		de marisqueo / marisqueira Conchylicole

Table 6: Conceptual patterns of constituent elements in modifier position

As a final step, we determine the dependency relation existing between the concept in the head and the concept in the modifier, so as to identify the intraconceptual relation present in the term. In this case, all modifiers being concepts of activity, and all heads being geographical location concepts, the relation linking them is the functional relation, because the modifier specifies the function of the head, or more specifically, the functional activity that is performed in that place. In the following table, the list of conceptually motivated patterns of term variation for the concept of PRODUCTION AREA is shown:

conceptual pattern		
head	**modifier**	**intraconceptual relation**
GEO LOCATION	AGRIC PROD+AQUAT PROD	FUNCTIONAL REL
GEO LOCATION	AGRIC PROD+ANIMAL	FUNCTIONAL REL
GEO LOC+BODY	GRAL PRODUCTION	FUNCTIONAL REL
GEO LOCATION	GRAL PROD+AQUAT PROD	FUNCTIONAL REL
GEO LOCATION	GRAL PROD+ANIMAL	FUNCTIONAL REL
GEO LOCATION	AGRIC PRODUCTION	FUNCTIONAL REL
GEO LOCATION	AQUAT PROD	FUNCTIONAL REL
GEO LOCATION	GRAL PRODUCTION	FUNCTIONAL REL

Table 7: Conceptual patterns of term variation for the concept of PRODUCTION AREA

The analysis shows that the naming alternatives of PRODUCTION AREA, despite exhibiting a surface variability, exhibit a certain amount of regularity. The next step is to examine the actual behaviour of these conceptually motivated patterns of term formation in texts in order to find some systematicity in their distribution in texts. As we suggested in section 1.2., our hypothesis is that term choice is determined on the one hand by factors belonging to the level of the system or structure, and on the other hand by contextual or usage-based factors, related to the situation of text production.

We will now explore the different motivations in the denomination of the concept of PRODUCTION AREA in relation to three factors: First, the conceptual motivation or the salience of a particular pattern or facet according to the concept class; secondly, the cultural motivation or the role of the language system, and finally, the contextual motivation or the role of the author's perspective in naming.

3.1. Conceptual motivation: role of concept class in naming

Terms are the linguistic expressions of concepts, and following the motivation principle that we developed in section 2.1., the term displays a selection of the most salient characteristics of the concept. When a concept is expressed through different terms showing different characteristics, the exclusive relevance of a single conceptual pattern is no longer maintained, but the question remains whether there are still some patterns that are more salient than others for the denomination of a particular concept class. This idea is suggested by some authors in the literature about term formation and term variation. Boisson (1996) refers to it as saillance conceptuelle, whereas Constantin de Chanay (2001) employs the term saillance perceptuelle. Kageura bases his theory of term formation on the assumption of "the existence of regularity at the level of concept and its correspondence with linguistic representation patterns" (Kageura 2002: 36) and shows that this regularity is present at the level of the conceptual class.

But it is in cognitive semantics that the largest amount of attention has been devoted to the study of salience phenomena, and it is at the core of proposals like prototype theory (Rosch 1978; Lakoff 1987). Geeraerts explores different salience phenomena in relation to lexical variation (Geeraerts et al. 1994; Geeraerts 2000). The relevance of a particular lexical item among all the possibilities of naming a given concept is referred to as onomasiological salience, and this theoretical concept is turned into a fully-operational and measurable variable according to the following definition:

> The onomasiological salience of a lexical category is the frequency of the lexical element naming the category divided by the cumulative [...] frequency [...] of the semantic values

> expressed by that lexical item. [...] Then, a lexical category is onomasiologically salient if it is a likely choice for the semantic values it expresses, that is, if it is stronger than the alternatives. Thus, given a corpus of language use, the onomasiological salience of an item like "skirt" can be calculated by counting how many times skirts are named in the corpus, and then checking how many times these are actually referred to with the lexeme skirt rather than alternative ones. (Geeraerts 2000: 90)

We are going to use this concept to explore the salience of some patterns over the alternatives for the concept of PRODUCTION AREA, by looking at their occurrence in the corpus. The question that we wish to answer is the following: Are there some patterns that are more salient than others, in the sense that they occur more frequently in the denomination of a given concept? In the description of the data in section 2, we pointed out a significant regularity in this denominative variability (26 terms). At the head, the concept of geographic location is chosen in the totality of the patterns, the only difference being that in one case it is combined with the agent, i.e. institution or administrative body that has carried out the division of the sea into administrative parts. In all cases, the modifier selects concepts of productive activity arranged on different levels of specificity – general, agriculture or aquaculture production— additionally subspecified by the object of the activity. The intraconceptual relation between the geographical location and the productive activity is the functional relation, because the place is designed for its functional activity.

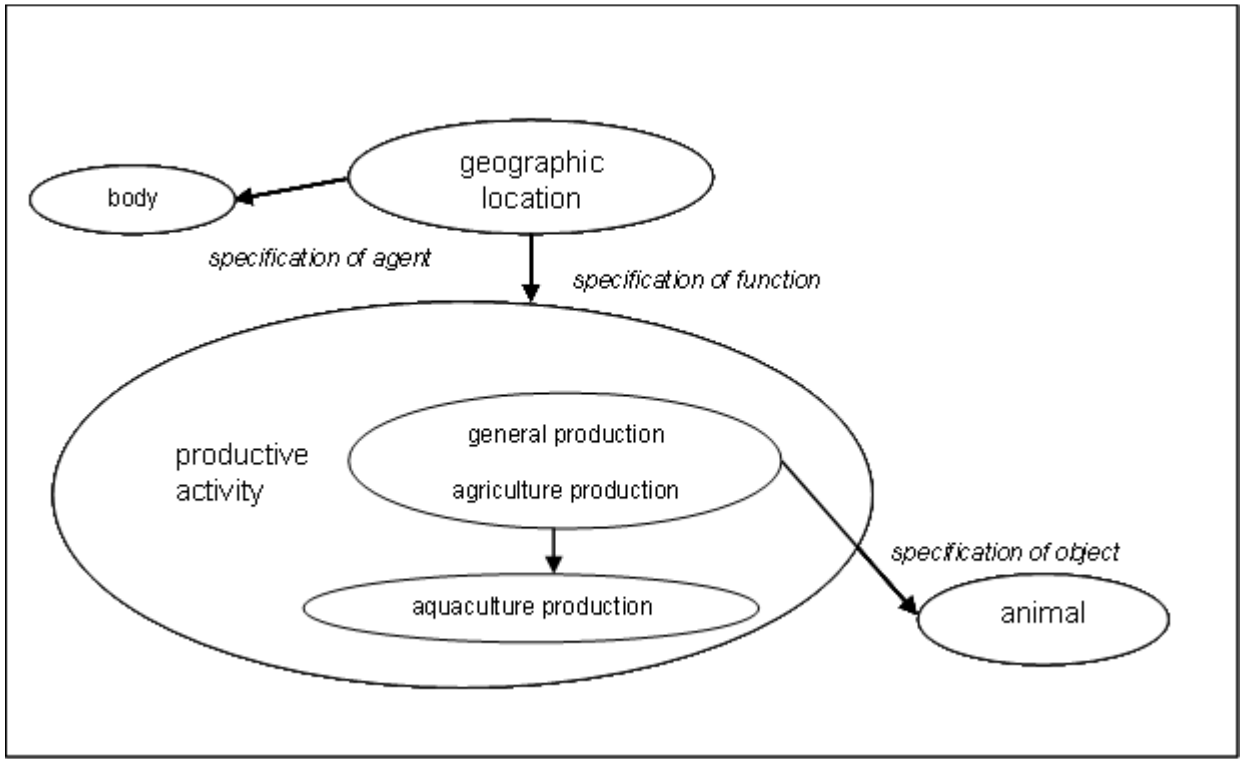

Figure 3: Denominative scheme of production area

If we look at the frequencies of the different subpatterns in the corpus, we observe that the pattern [GEOGRAPHICAL LOCATION + GENERAL PRODUCTION] <-- FUNCTIONAL RELATION is by far the most frequent, since it occurs 151 times through 7 denominative variants – área de explotación, área de producción, zona de producción, zona productiva, bassin de production, site de production, zone de production — representing almost 70% of the occurrences of the concept. Consequently, we conclude that it is the most salient pattern for the naming of PRODUCTION AREA:

conceptual pattern				
head	modifier	intraconceptual relation	freq pattern	%
GEO LOCATION	AGRIC PROD+AQUAT PROD	FUNCTIONAL REL	1	0,46
GEO LOCATION	AGRIC PROD+ANIMAL	FUNCTIONAL REL	1	0,46
GEO LOC+BODY	GRAL PRODUCTION	FUNCTIONAL REL	3	1,38
GEO LOCATION	GRAL PROD+AQUAT PROD	FUNCTIONAL REL	6	2,75
GEO LOCATION	GRAL PROD+ANIMAL	FUNCTIONAL REL	9	4,13
GEO LOCATION	AGRIC PRODUCTION	FUNCTIONAL REL	17	7,80
GEO LOCATION	AQUAT PROD	FUNCTIONAL REL	30	13,76
GEO LOCATION	GRAL PRODUCTION	FUNCTIONAL REL	151	69,27
		TOTAL	218	100

Table 8: Onomasiological salience of conceptual patterns according to their occurrence in corpus

3.2. Cultural motivation: role of language system in naming

The affirmation of the cultural relativity of scientific and technical knowledge is one of the breakthroughs of contemporary theories of Terminology (Gaudin 2003; Diki-Kidiri 2008). Special concepts are rooted in the cultural system in which they are created, and the linguistic expression of specialised knowledge is also dependent on the natural language in which it is employed. As Lara maintains, "technical terms are not a verbal elaboration strange to the signification processes of ordinary languages, and to that extent, it cannot be alienated from culture" (Lara 1999: 52).9

We wish to explore the role of language in the naming of PRODUCTION AREA, by asking ourselves the following question: Do we find the same motivations in concept naming in French and Galician? If we look at the presence of the conceptually motivated patterns in each language, we immediately observe that the distribution is not the same, since four out of eight patterns are present in only one language:

conceptual pattern				
head	modifier	intraconceptual relation	Galician	French
GEO LOCATION	AGRIC PROD+AQUAT PROD	FUNCTIONAL REL	✓	x
GEO LOCATION	AGRIC PROD+ANIMAL	FUNCTIONAL REL	x	✓
GEO LOC+BODY	GRAL PRODUCTION	FUNCTIONAL REL	✓	x
GEO LOCATION	GRAL PROD+AQUAT PROD	FUNCTIONAL REL	x	✓
GEO LOCATION	GRAL PROD+ANIMAL	FUNCTIONAL REL	✓	✓
GEO LOCATION	AGRIC PRODUCTION	FUNCTIONAL REL	✓	✓
GEO LOCATION	AQUAT PROD	FUNCTIONAL REL	✓	✓
GEO LOCATION	GRAL PRODUCTION	FUNCTIONAL REL	✓	✓

Table 9: Presence or absence of patterns in French and Galician

Furthermore, if we look more closely into the data, we observe that in two of the patterns there is a motivated lexicalisation exclusive to the French language and thus does not appear in Galician, viz. naming the object of the activity of shellfishing by the characteristic of having a shell. This is present in the concept class of aquaculture production –*conchylicole*— and in the denomination of the animal kind –*coquillage*. In Galician, these two patterns are realised by selecting a bunch of other characteristics, such as the origin of the product –the sea in *marisqueo / marisqueira* — or morphological characteristics, like having two valves –bivalvo — or having a soft body — *molusco*.

		denominative variant	
conceptual pattern		French	Galician
head	modifier	"having a shell"	"from the sea / two valves"
GEO LOC	AQUAT PROD	bassin conchylicole espace conchylicole zone conchylicole	zona de marisqueo zona marisqueira
GEO LOC	GRAL PROD +ANIMAL	zone de production de coquillage	zona de producción de bivalvos zona de producción de moluscos bivalvos e outros invertebrados mariños

Table 10: Different motivations in the naming of shellfish in French and Galician

3.3. Contextual motivation: role of subject field in naming

The subject field is an essential notion in Terminology, because it is the element that organizes specialized knowledge. Ideally, each area of specialisation has a concept system made up of concepts that inherently belong to a subject field. Nevertheless, the division of knowledge among disciplines is a hermeneutic operation carried out for functional purposes; and special knowledge as we conceive it today is multidisciplinary and cannot be attributed to a single specific subject field. Therefore, it is possible to find the presence of different subject fields in texts belonging to the same topic. This implies a different perspective upon the same concept that may modify the perception of the most salient characteristics, and this may have an effect on the lexical choice. Some authors have reflected on this issue: Tebé (2005: 23) points out that the subject field is a value that can be reflected in the denomination of a given concept. Zawada and Swanepoel (1994: 254) affirm that to the sender, different characteristics might be considered essential, and Cabré & Estopà (2002: 151) submit that the same concept can be considered from different perspectives within the same text:

> Mistreatment of women can be approached within the same text from the perspective of Medicine, Law, Psychology, Social care, citizens' Security, Sociology, Economics or Politics. (Cabré & Estopà 2002: 151) [10]

In this section, we want to explore the effect of the sender's perspective in term choice, determined by his or her affiliation to a specific subject field. We have worded the question as follows: Do experts belonging to different subject fields make the same lexical choices? In our corpus of texts on aquaculture, we have identified the presence of three main subject fields: economics, biology and law. This information has been obtained by looking at the affiliation of the author(s) of the texts and the text types in the case of legal texts:

subject field	topic	n° texts French	n° texts Galician	total n° words
biology	environmental aspects of aquaculture	3	2	49.066
biology	production technologies	3	6	16.859
economics	harvesting, processing and marketing	7	6	156.435
economics	management of aquaculture ressources	4	2	32.316
law	legal aspects of aquaculture	4	3	33.378
	TOTAL	**21**	**19**	**323.208**

Table 11: Subject fields covered in the corpus of aquaculture texts

We have looked at the frequency of distribution of the three main conceptual patterns, which differs in the subclasses of productive activity selected in the modifiers – general production, agriculture production and aquaculture production—in our corpus with a view to finding a correlation between the lexical choice and the presence of a certain subject field. The results are shown in figure 4.

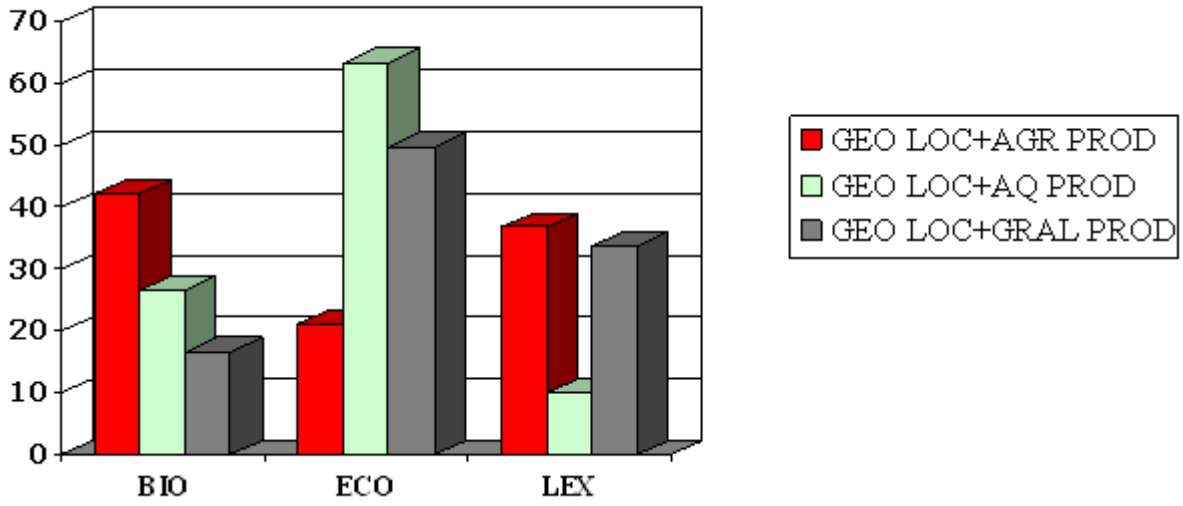

Figure 4: Distribution of conceptual patterns according to subject fields

As we see from the graphic, the distribution of the conceptual patterns varies according to the subject field. In our opinion, the reason for this might be the different viewpoints that are given preference depending on the understanding of the concept. As a matter of fact, the pattern of GEO LOC+AGR PROD appears more frequently in texts written by biologists, with 42.11% of the total number of occurrences. This is due to the fact that the concept class of agriculture production — which is realised trough the denominations espace de culture; secteur d'élevage; site d'élevage; zone de culture, zone d'élevage de mollusques, zona de cultivo, zona de cultivo e marisqueo — puts emphasis on the manner in which shellfish is produced. In contrast, the pattern GEO LOC+GRAL PROD occurs in 49.7% of the texts on economics. If we observe the lexicalisations of that pattern 11, the lexical categories that are employed –

producción/production and explotación — highlight the economic output of the activity. However, in economic texts the most frequent pattern remains GEO LOC+AQ PRODUCTION, which is the unmarked pattern in the field of aquaculture because it selects the basic level category within this particular subject field: bassin conchylicole, espace conchylicole, zone conchylicole, zona marisqueira, zona de marisqueo. Therefore, in contrast to the other two patterns its realisation cannot be linked to the choice of a specific point of view.

4. CONCLUDING REMARKS

In this article we have explored the effect of some systemic and contextual factors in term choice by looking at the different denominative variants of the concept of PRODUCTION AREA in a corpus of texts on aquaculture. We have shown that the choice of a denominative variant is not always arbitrary, but influenced by the structure of the concept (section 3.1.), by the cultural system in which the language is rooted (section 3.2.), and by the subject field in which the author works (section 3.3.). Therefore, based on the evidence of this corpus-based study, we hope to have shown the motivated nature of some forms of denominative variation.

This small case study may be useful as an indication of a general trend; however, the results are not intended to be fully conclusive. Our purpose was to test the methodology of analysis which has proved to be successful in discovering the regularities of term variation. We are currently applying this methodology to a larger amount of data in order to compare denominative trends among different concept classes, as well as to explore the influence of other contextual-related factors, which have not been described in this article, such as the text type, the level of specialisation and the author's purpose. 12 We hope that although of limited scope this study has contributed to the understanding of term formation and term variation in real communication contexts.

[1]This work is part of the research project TEXTERM 3, funded by Ministerio de Educación y Ciencia (HUM2006-09458).
[2]The quotation is originally in Spanish: "Todo proceso de comunicación comporta inherentemente variación, explicitada en formas alternativas de denominación del mismo significado (sinonimia) o en apertura significativa de una misma forma (polisemia). Este principio es universal para las unidades terminológicas, si bien admite diferentes grados según las condiciones de cada tipo de situación comunicativa." (Cabré 1999: 85).
[3]The table is taken from Fernández-Silva, Freixa & Cabré (2008).

[4]The table is a simplification of the typology proposed by Kocourek (1991: 175), which includes phonic / graphic motivation, loanword motivation and motivation by reduction.
[5]Council Directive 91/492/EEC of 15 July 1991 laying down the health conditions for the production and the placing on the market of live bivalve molluscs. Official Journal L 268, 24/09/1991 P. 0001 – 0014. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31991L0492:EN:HTML.
[6]For statistics concerning European aquaculture:
http://ec.europa.eu/fisheries/cfp/aquaculture_processing/aquaculture/figures_en.htm

[7]The equivalence in Galician was validated by Lino Lema Bouzas, Director-General of Fisheries Research and Development at the Galician Government Department of Fisheries and Maritime Affairs. For the terms in French, we counted on Daniel Priour, engineer on marine technologies for fishing and aquaculture at the IFREMER (Institut de Recherche pour le Développement de la Mer). The equivalence between the two languages was validated by Antonio Gutiérrez González, member of the General Direction of Fisheries at the European Commission. We wish to express our gratefulness to all of them for their valuable collaboration.
[8]We have computed zone in French and zona in Galician as the same lexical category.
[9]The quotation is originally in Spanish: "El término técnico no es una elaboración verbal ajena a los procesos de significación de las lenguas ordinarias y, en esa medida, resulta imposible enajenárselo a la cultura". The translation is ours.

[10]The quotation is originally in Spanish: "Los maltratos a mujeres pueden ser abordados en un mismo texto dentro de la óptica de la medicina, el derecho, la psicología, la educación social, la seguridad ciudadana, la sociología, la economía o incluso la política" (Cabré y Estopà 2002: 151). The translation is ours.

[11]área administrativa de producción, área de explotación, área de producción, zona administrativa de producción, zona de producción , zona de producción de bivalvos, zona de producción de moluscos bivalvos e outros invertebrados mariños, zona productiva, bassin de production, site de production, zone de production, zone de production conchylicole, zone de production de coquillage.

[12]Fernández-Silva, Sabela (forthcoming). Denominative variation with cognitive consequences: motivation, structure and behaviour in context. Institut Universitari de Lingüística Aplicada, Universitat Pompeu Fabra. This PhD thesis, under the supervision of Prof. Judit Freixa and Prof. Teresa Cabré has financial support from the Spanish Ministry of Education and Science within the framework of the FPU – Training of University Teaching Staff—program.

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Johan Myking
University of Bergen

(YET ANOTHER) TAXONOMY OF MOTIVATIONS

Abstract

The purpose of this article is to discuss the status of motivation as a principle of term formation within the theory of terminology and from a non-normative perspective. The question is raised whether it makes sense to taxonomise the concept of motivation. Some existing taxonomies are discussed and an extended model is proposed. The paper emphasises the functions of metaphorical and morphological motivation with respect to primary vs. secondary term formation. It is argued that the status of motivation must be discussed taking into account this essential distinction, allowing for compatibility of opposite views.

INTRODUCTION

The purpose of this article is to discuss the status of motivation as a principle of term formation within the theory of terminology. It has been pointed out by Roald (1986: 178) that to some extent, accounting for term formation has produced nothing more than a list of formation types also present in general language. We might informally refer to this fact as the "catalogue problem" of term formation. Accounting for term formation is a huge task and according to Humbley (this volume) it includes more than accounting for motivation. It is nevertheless a fact that discussions on the status of motivation have played an important part in discussions on term formation within 'old' and 'recent' paradigms from a descriptive as well as prescriptive point of view, including attempts to classify the phenomenon and to develop taxonomies that may in turn be used to account for term formation.

In this article I shall in particular address the following question:

1. Is taxonomisation of motivation possible, feasible and fruitful from a non-normative point of view?

It is important to note that motivation most often opposed to arbitrariness. On the basis of this dichotomy, the lexicon is divided into two broad sectors, that of 'motivated' vs. 'non-motivated' words. This is the case with many interpretations of Saussure, although not restricted to this tradition. No adequate classification – if at all useful or possible to establish – can stop at this stage, and it is demonstrated below that attempts have been made to solve this problem either by developing models that are more detailed or by taking recourse to the principle of gradedness. On the basis of existing models, a revised taxonomy of motivation types will be proposed. To arrive at this end, three additional questions will be addressed.

2. What is the relationship between motivation and term formation?

It seems that classifications of motivation types have not always been based on identical semiotic assumptions. Motivation is sometimes equated with transparency or iconicity of expression, sometimes with the relationship between concept and expression. The result of different approaches to term formation may be that different aspects are emphasized.

3. The status of motivation within diverging approaches to theory – do we find conflict, divergence, unification?

Whether or not motivation is considered a fundamental property of terminology may be a sign of demarcation between different approaches to terminology. In this respect, we could say that motivation is perhaps assigned a 'parametrical' function, that is, a symbol of main scientific positions. This is an important background for discussing the problem.

4. What is the relationship between terminology and parallel trends within general linguistics?

The observation referred to by question 3 is meaningful only with regard to the recent discussion between Wüster-oriented terminology that is often referred to as the 'tradition' on the one hand, and recent trends such as socio-cognitive terminology on the other hand, e.g. Temmerman 2000. Underlying this dichotomy we find structuralist vs. cognitive linguistics, but still, in a very broad sense.

In order to arrive at an answer to question 1 above and to arrive at a classification of motivation types derived from previous classifications by Drozd & Seibicke (1973) and Kocourek (1991), questions 2–4 will also have to be addressed. They are discussed in some detail with reference to some overall semiotic parameters1.

WHY MOTIVATION?

For several reasons problems pertaining to motivation deserve increased attention.

a) The normative importance of motivation

Writings on motivation have often concentrated on the normative importance of the concept, emphasising such values as communicative efficiency, understandability, hence promoting democracy and access to knowledge. Although disputed and discussed with reference to its conflict with the principle of economy, this normative emphasis on motivation is present in writings on terminology within most camps and by most writers (cf. Myking 2008, ch. 2). Some examples:

> The constituents of terms should represent the most important characteristics of the concept. (Felber 1984: 19)
> Transparenz und Motivation der Fachausdrücke, Verständlichkeit und demokratische Aspekte des Abbaus von Informations- und Sprachbarrieren müssen dabei erhalten werden. (RaDT)
> *Non-negotiable*: words formed must reflect characteristics of the concept to be named. (Antia 2005: 1)

Within Russian terminology, motivation is even seen as an alternative to definitions although this rather radical position is probably not generally representative:

> full motivation of a term by means of its direct or indirect (implied) constituents actually plays the role of a definition, thereby making the latter absolutely superfluous. (Leitchik & Shelov 2003: 89)

In this paper it is argued that a normative aim is essential to terminology as a branch of applied linguistics. On the other hand, any theoretical principle must be assessed according to the tenets of descriptive linguistics, a task that is no less difficult than assessing the tenets of various schools or branches within the broad discipline of linguistics.

b) Morphology-biased definitions

Based on the Saussurean notion of relative motivation (compounds and derivatives, cf. below), it can be demonstrated that within terminology the emphasis has often been put on morphological, or, more specifically, on morpho-semantic, aspects. Motivated terms are transparent in terms of the relationship between compositional and actual meaning, as shown in the following quotations:

> A term is motivated when a language user is able to deduce, at least partly, the meaning of the term from the analysis of its components. Words that respect the morphological laws are generally said to be motivated. (Sonneveld & Loening 1988: 2)

> Si le seul contenu évoqué par la forme du terme n'est que celui du sens global, le terme est arbitraire (ex. pompe). Si, en plus du sens global, la forme suggère des éléments de contenu qui indiquent pourquoi la forme est employée pour désigner (symboliser) le sens donné, le terme est motivé (descriptif, ex. pompage [...]. (Kocourek 1991: 172)

This tradition may be said to be 'biased' in the sense and to the extent that other types of motivation are neglected, as claimed by authors representing recent trends in terminology (cf. below). There is a link between the concepts of 'morpho-semantic' and 'normative' that has generated criticism. In particular, it has been claimed that semantic motivation by means of metonymy and metaphor has been neglected.

c) A disputed status: structuralism vs. cognitivism

The concept of motivation has been a topic of discussion in linguistics for centuries. We can fit the problem of motivation vs. arbitrariness into the following simple scheme:

- Strict Saussurian/American structuralism, including generativism, emphasises arbitrariness.
- Cognitive linguistics and recent functionalism emphasise motivation.
- Prague-inspired structuralism and functionalism invest a large interest in motivation.

In this sense, motivation and arbitrariness may be assigned a 'parametrical' status for different directions of linguistics. Simeone (1995) states that thanks to structuralism and generativism, motivation has been considered secondary to arbitrariness throughout most of the 20th Century, whereas today a state of equilibrium exists as a result of functionalist and cognitivist trends. Hence, the importance of motivation at different levels of language has been recognised to a higher extent. Very broadly speaking, as a point of departure we accept that Saussure's structuralist approach has been dominating throughout the 20th Century, stressing the importance of arbitrariness as the design feature of language. Similarly, we accept that motivation is a basic tenet of cognitive linguistics (e.g. Radden & Panther 2004). This very general picture provides the context for e.g. Temmerman's cognitively-based criticism of traditional Wüsterian terminology to which she attributes the label of 'arbitrariness'(Temmerman 2000: 44, see below). This is an important issue of discussion as it has normative implications as well: Motivation of expression is a basic tenet for most terminologists working in the Wüsterian tradition, whereas arbitrariness is recognised as the basic concept-term-relationship.

d) Indeterminacy, definition problems, confusion: What is the topic of discussion?

The term motivation seems to represent at least four concepts (cf. Myking 2008):

> a. The semiotic principle of non-arbitrariness, i.e. the negation of arbitrariness, cf. e.g. Saussure.
> b. The semiotic property of iconicity, whose importance is recognised in general (functional) linguistics and not restricted to the lexical level.
> c. The morphological (morphosemantic) property of transparency, which is widely accepted as a parameter of complex expressions within morphological theory.
> d. The onomasiological and normative property of reflecting conceptual characteristics, closely linked to (c) and considered important by most terminology boards.

Writings on motivation reveal the interdependence of psychological, morphological, and prescriptive aspects of the concept. Allegedly, a too narrow perspective is leading to reduction and exclusion of other motivation types. Such problems must be dealt with if taxonomisation is to be possible.

COGNITIVE CRITICISM OF THE TERMINOLOGICAL TRADITION

The best known criticism of traditional terminology is perhaps that of Temmerman 2000. I do not intend to give a full account of her position in this article, but among a number of other parameters, motivation is also addressed. Temmerman concludes that:

> The use of figurative language like metaphorisation is one way of arriving at motivated naming. [...] Traditional terminology is phobic about this phenomenon. (Temmerman 2000: 44)

It is worth noticing that she speaks of "one way of arriving", not "the only way". If the terminological tradition has perhaps had a morphological bias, Temmerman is shifting the emphasis to an allegedly neglected motivation type, that of metaphor. This shift is of course also an indication of the more profound cognitive turn in linguistics, in which metaphor is considered an instance of concept formation and not just a property of the expression. Whereas in my view Temmerman's criticism of the 'tradition' is

too general, it is worth noticing that she is not addressing the same concept of motivation as the one found in traditional writings. Motivation in cognitive linguistics refers to concept formation and hence a motivated link between concept and expression, whereas motivation in the terminological tradition is to a higher extent a communicative parameter related to the expression alone. In my view, we also have to distinguish between primary and secondary term formation in order to get a better view of this problem, see below.

Criticism along the lines of cognitive linguistics (like Temmerman's) can, as a consequence, be interpreted as a reaction to the Wüsterian tenet of the two realms or "Reiche", i.e. the independent existence of concept and term (cf. Laurén & al. 1998). This alleged "arbitrariness paradigm" is opposed by the cognitivist insistence on motivation (motivated structures) as the main design feature of language. Perhaps the most important consequence is an increased attention to metaphor. In fact, in cognitive linguistics metaphor is considered the most interesting instance of motivation. Cognitivist approaches as a whole refute the view of expressions as arbitrary labels, and consequently, metaphor has to be the focus of interest in cognitivist inspired 'socio-cognitive' terminology. As stated in Myking (2001), this cognitive trend also advocates a non-normative and purely descriptive approach to terminology, yet another reason to refute the normative-morphological bias of motivation on the part of tradition.

TYPOLOGIES OF TERM FORMATION – ULLMANN AND DROZD & SEIBICKE

The classical structuralist classification of motivation, often quoted by terminologists, is Ullmann's (e.g.1972): "Three types of motivation": phonetic, morphological, and semantic motivation. The main merit of Ullmann's approach was to include semantic motivation in the Saussurean typology, as it "obviously works the same way" (Ullman 1972: 92), i.e. the literal sense underlying a metaphor provides a motivational basis in relation to which the motivatedness can be described. Ullmann also pointed to the problem of subjectivity: for a word to be motivated, it must be felt to be motivated.

Ullman's typology is supported and further developed by Drozd & Seibicke (1973: 129), distinguishing between two types of morphological motivation, regular vs. irregular morphological-semantic motivation (the latter seen as a product of demotivation or lexicalisation). Upon closer reading, the work of Drozd & Seibicke 1973 reveals an underlying dichotomisation of words into motivated and non-motivated, shown in this table (from Myking 1998: 333, page numbers refer to Drozd & Seibicke 1973):

MOTIVATED TYPES	NON-MOTIVATED TYPES
Onomatopoetika (130)	
Zusammensetzungen (67) Derivate (67, 129) *externe [...] Syntagmen (133)*	
	Moneme, Monomorpheme (67, 129), [Wörter] etymologischer Ursprung (de/en Stein/stone 67) *terminologisierte Moneme (129)* *Abkürzungswörter (67)*
metaphorische oder metonymische Übertragung (130)	
Neubildungen aus Fremd- oder hybride Bildungen (135)	
	Entlehnungen aus fremden Sprachen, Fremdwörter, Internationalismen (62, 129)
Nullmotivation, Demotivierung (54, 159)	
alogisch motivierte Termini (139ff.)	

Table 1: An interpretation of Drozd & Seibicke's view on motivated terms

This table is, apparently, a deliberate simplification of complex matters, and the position of Drozd & Seibicke is indeed complex. On the one hand, the quotations in the table indicate more or less implicitly that a dichotomy of motivated vs. non-motivated is possible:

Bekanntlich kann man entweder motivierte Termini (auch sprechende T.) oder nichtmotivierte Termini bilden (Drozd & Seibicke 1973: 54, emphasis by D & S)

On the other hand, however, they clearly state that the communicative merit of motivation, that of producing "sprechend" ('self-explanatory') terms , is not to be equated with the category of 'motivated' as such, but only with the outcome of morphological-semantic motivation – and then we are back to derivatives, compounds and phrases: "Die Motiviertheit ist aber nicht restlos mit der Durchsichtigkeit zu verwechseln" (Drozd & Seibicke 1973: 129), implying that "sprechend" is the same as regular morphological motivation:

Bei der regelmässigen Motivation ist es aufgrund der durchsichtigen Anreihungsbeziehung ohne Schwierigkeiten möglich, den Inhalt in einer Wortzusammensetzung oder -ableitung aufgrund von konstituierenden Inhaltsträgern abzulesen. Auf diese Weise werden die eigentlichen "sprechenden" Termini gebildet. (Drozd & Seibicke 1973: 130)

According to this reading there is, consequently, no strict implicit or explicit dichotomy after all, but rather an underlying tendency towards a more scalar approach that leads to a recognition of a full range of types according to varying pragmatic needs. If morphosemantically transparent terms have their merits in different contexts, the use of 'arbitrary' and morphologically simplex loans may also have their merits in other contexts. There is a fuzzy area between 'terms formed by motivation' and 'motivated choices of terms'. 'Unmotivated' term types (cf. table 1) such as acronyms and simplex terminologisations may well be used in texts as a result of motivated choices in which linguistic, cultural, and genre-specific norms interact.

If, to conclude, Drozd & Seibicke represent the terminological 'tradition', this 'tradition' cannot be accused for neglecting motivation as such, since they recognise metaphorisation as a fact of language. Drozd & Seibicke (1973: 131) point to alternative merits of metaphor such as unambiguity of interpretation, and we could also add Wüster's observation that metaphor serves language economy (Wüster 1985: 53). If it is true that the tradition has been 'biased' towards morphosemantics, as discussed above, this position is, to conclude, not without nuances.

TYPOLOGIES OF TERM FORMATION – KOCOUREK (1991)

Kocourek (1991) discusses motivation from a semasiological as well as an onomasiological point of view. One important consequence of Kocourek's approach is that term formation is equated with motivation. In his typology, motivation is compared to term formation, and the following model is given (Kocourek 1991: 175), shown in figure 1:

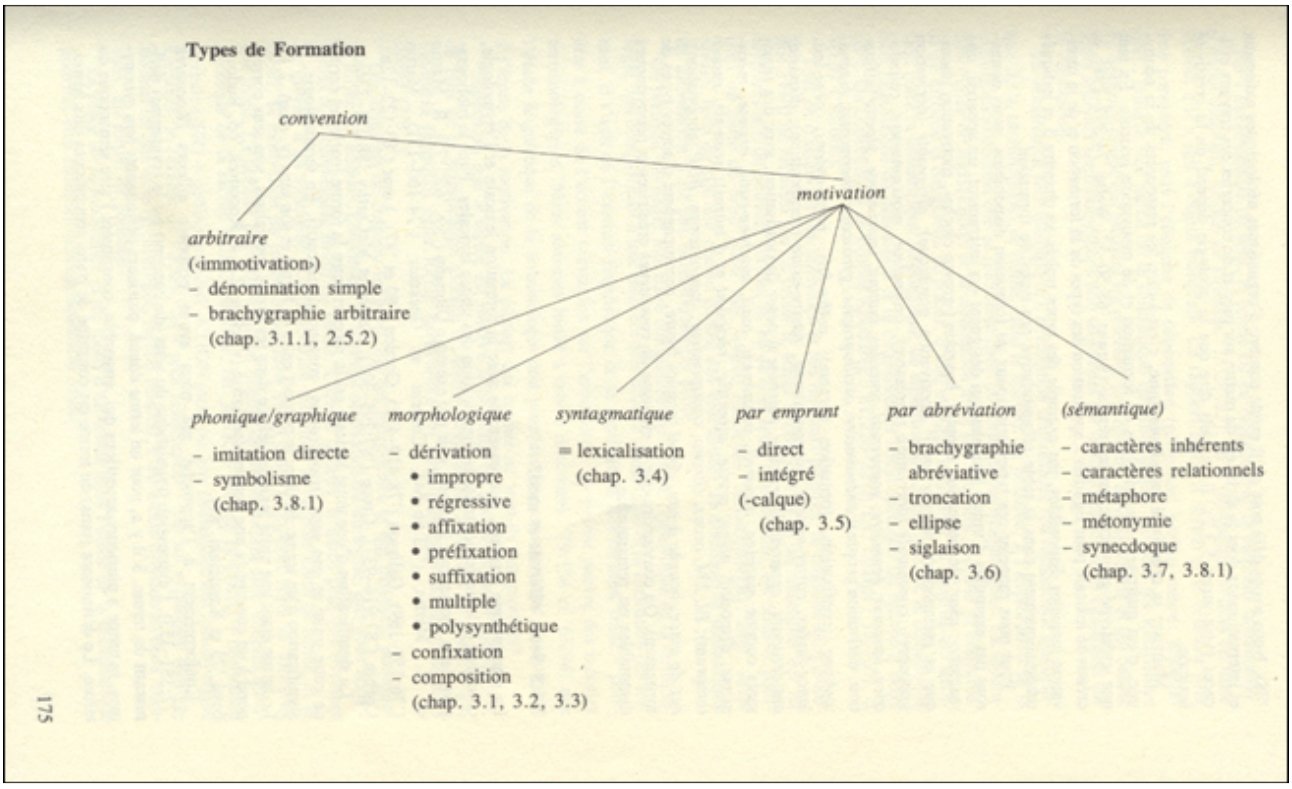

Figure 1: Motivation according to Kocourek (1991: 175)

Kocourek's model of motivation resembles that of Drozd & Seibicke in that it departs from a dichotomy, that of arbitrariness vs. motivation. Kocourek's approach apparently avoids simplification even more explicitly, since it does not restrict motivation to the types points out by Ullmann (morphological vs. semantic), and neither does it equate arbitrariness with convention. The model is also explicit in including a number of well-defined lexical categories under each class, and it is radical in the sense that the number of ''motivated'' types has been increased considerably to a maximum. Structuralist in its inspiration (similarly to Drozd & Seibicke), Kocourek's model takes a clear stand that motivation is the focal point of interest in dealing with term formation. The model also allows for motivation as a cross-linguistic phenomenon by including loans. This point is important because a source expression always provides a motivational model of reference which has some psychological reality to those creating a secondary target expression – a phenomenon termed secondary term formation by Sager (1990:80, see below).

Kocourek's (1991: 173) example, the simplex term gas motivated etymologically by Greek chaos, demonstrates that his approach also allows for gradedness and psychology post hoc as motivated phenomena: If language users have a graded and varying etymological knowledge of the linguistic model gas, the motivation of chaos will also be graded and varying. This point corresponds to Ullman's observation of subjectivity (cf. above) and is also valid for general word formation. In general, it is reasonable to state that Kocourek's model recognises the creative potential of the entire set of lexical resources, central as well as peripheral, and that a strictly synchronic view of motivation is difficult to apply.

The relationship between term formation and motivation is not, however, completely isomorphic, as some correspondences seem blurred. "Semantic motivation', for instance, does not refer only to metaphor or terminologisation as in the more traditional approach, but also to the use of distinctive semantic features in morphologically motivated compounds. In the English–Norwegian example derrick vs. boretårn (literally "drill tower", cf. table 3 below), the English term may be interpreted as a metonym and the Norwegian equivalent as a morphosemantically transparent term containing the distinguishing feature [USED FOR DRILLING]. The semantic motivation of derrick is global whereas it is partial in the Norwegian equivalent2.

If we compare the approaches of Drozd & Seibicke and Kocourek, it is reasonable to conclude that structuralist approaches recognise that existing LSP lexicons are dominated by motivation and not by

arbitrariness, at least with regard to the overall quantitative picture: "La plupart des termes ne sont-ils pas motivés?" (Kocourek 1991: 177) "[...] il n'existe que peu de termes arbitraires (op.cit., 173)" , "In quantitativer Sicht kann man schon rein empirisch feststellen, daß in den meisten [Fach- und Wissenschaftssprachen] motivierte Termini vorherrschen" (Drozd & Seibicke 1973: 129).

REDUCING THE BARRIER BETWEEN TERMINOLOGY AND GENERAL LANGUAGE?

It is also worth noting that the above quotation by Temmerman should be viewed in its context, which is the following quotation by Rondeau:

Motivation. Voilà une qualité désirable, mais qu'il faut éviter de rechercher à tout prix. Au contraire, quand la motivation s'appuie sur des rapports sémantiques dérivés de la langue commune, elle peut être nuisible, car elle aura tendance à encombrer le néonyme de connotations qui n'ont rien à voir avec la notion à exprimer. (Rondeau 1984: 135)

To state that morphological term or word formation means formation from existing bases begs the question which (types of) bases. Rondeau's quotation refers to the traditional interpretation of motivation as replacing foreign words by native, be it for reasons of purism alone or the use of native lexical resources in order to bridge the gap between learned and popular vocabulary and thus reduce barriers of understanding and communication in society. In this respect, an emphasis on "sprechend" (cf. Drozd & Seibicke) in the normative/onomasiological sense is favorable because it is linked to regular morphological motivation since e.g. composition mainly favours the use of native and familiar elements. As discussed above, 'learned' word-formation also makes use of motivating bases, although in this case such bases are not taken from ordinary language. The dichotomy of 'motivated' and 'arbitrary' is not, consequently, equivalent to the dichotomy of 'native' vs. 'foreign/learned'.

If, further, a type of motivation exists that does not produce "sprechend" ('self-explanatory' terms, the implication is that "sprechend" ('self-explanatory') is a specific concept subordinate to a generic concept of "motivated". It is perhaps better to consider 'sprechend' or 'self-explanatory' as pragmatic properties rather than specific morphological concepts, and this would mean extending the notion of "motivated" from the linguistic to the psychological level. Kocourek's analysis (cf. above) of gas being motivated by chaos corresponds (conversely) to Drozd & Seibicke's observation about conscious zero-motivation:

Theoretisch wird angenommen, daß das Wesen der Motivierung darin liegt, daß im Entstehungsakt des Terminus jede Bildungsweise motiviert wird – selbst in solchen Fällen, wenn ein nichtmotivierter Terminus gebildet wird. In solchen Fällen ist es eben die beabsichtigte ausbleibende Motivierung, die den Motivierungsgrund darstellt [...] Als Motivierungsgrund der Wortbildungsweise sehen wir dann eine zielbewußte Demotivierung an. Auf diese Weise kann also die Demotivierung zum Wortbildungsprinzip in der Terminologie erhoben werden. (Drozd & Seibicke 1973: 54)

If in fact zero-motivation constitutes an important form of motivation, 'learned' word-formation on the basis of Greek or Latin elements is also motivation, and this point is explicitly made in Kocourek's model, cf. 'confixation' (Kocourek loc.cit.), and also gas < chaos, cf. above.

AN ATTEMPT AT COMPLEMENTARITY

The analysis of the concept of motivation in terminology reveals that there is a considerable degree of indeterminacy with respect to its status, and it is not very easy to make typologies of phenomena that are difficult to delimit at the generic level. The four dimensions mentioned above (a–d) have to be distinguished and at the same time interconnected before a revised typology can be made.

Extending motivation from linguistics to psychology is no radical step, as already Ullmann's observation about subjectivity (cf. above) refers to a psychological fact. Cognitive linguistics nevertheless broadens the perspective from structure to extra-linguistic factors, such as intentions and context. This point is also made in the definition by Radden & Panther (2004) within the framework of cognitive linguistics. The line of thought from Drozd & Seibicke to cognitivism in this respect becomes strikingly clear:

A linguistic unit (target) is motivated if some of its properties are shaped by a linguistic source (form and/or content) and language-independent factors. (Radden & Panther 2004: 3)

Reducing 'structuralism' to 'Saussurian structuralism' is, on the whole, perhaps a little simplistic. Even Saussure recognised the importance of 'relative' (morphological) motivation. If generativism, in a broad sense, is considered a branch of structuralism, it is perhaps true that motivation is neglected. But the functional approach of the Prague school is also structuralism, and within this school the interest in motivation is evident. Drozd & Seibicke as well as Wüster and the Russian/Soviet school of terminology can be seen as branches of structuralism, and their interest in the topic of motivation is evident and important. The same applies to Wüster, even if apparently he did not use the term 'motivation' but spoke of other functional parameters such as 'Merkhilfe' and 'einprägsam' ("Die selbständige Merkhilfe der Begriffsform soll möglichst groß sein", Wüster 1966: 111).

My own position vis-à-vis these problems has been and still is one of complementarity, as discussed in the works by Laurén & al (1998, 2008). One way of arriving at a clearer understanding is to analyse the dichotomy 'motivation' and 'arbitrariness' on different levels, and to separate the near-synonyms of motivation and iconicity, cf. figure 2:

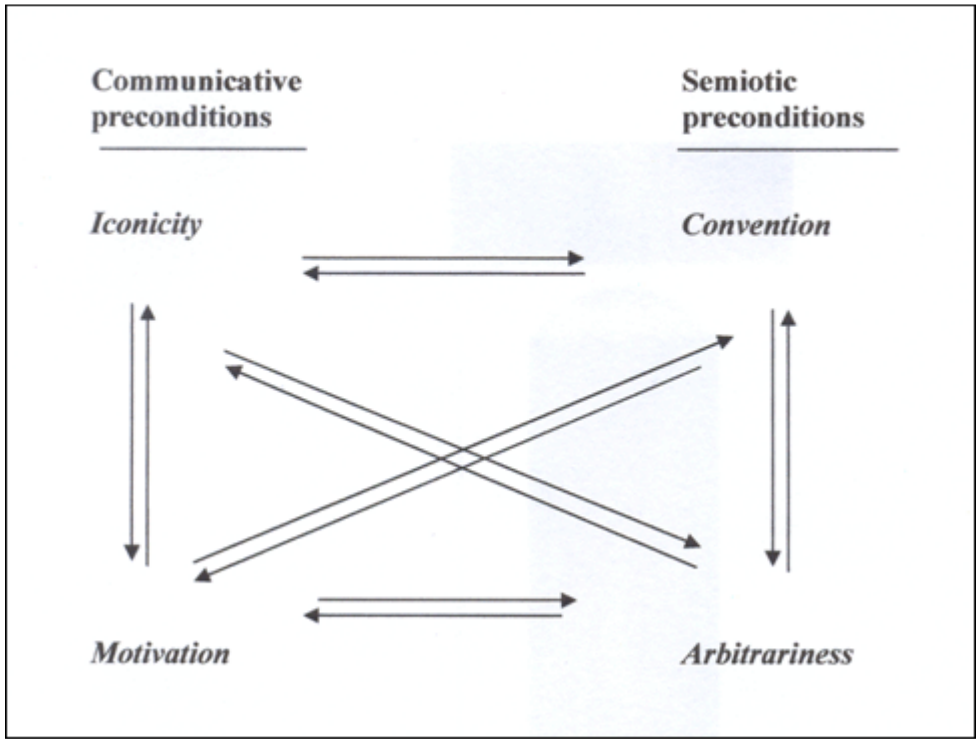

Figure 2: A general model of Semiotic and Communicative preconditions (Laurén et al. 2008: 105. English translation by JM)

This means that

- Arbitrariness is valid and fundamental in order to account for normative measures as well as for the phenomena of translation, revision, and term assignment
- Arbitrariness and motivation are scalar concepts; they should be considered two extremes subordinated to the principle of convention (cf. Kocourek 1991).
- It is important to establish a distinction between motivation and iconicity (cf. Laurén & al. 2008: 89–92). Iconicity should be defined as an instance of motivation, not as identical to motivation

On this basis, motivation can be defined in a way closely parallell to Radden & Panther's definition:

> Motivation: Projicering af en del af indholdssiden ind i udtrykssiden, således at udtrykssiden gør det muligt at associere indholdssidens viden med allerede eksisterende viden. [Motivation: The projection of a part of the content into the form, thereby enabling the receiver to associate his or her knowledge of the concept with his or her existing knowledge.] (Laurén & al. 2008: 89, translated by JM)

By means of the keyword 'associate' (Da. associere), this definition explicitly includes the psychological dimension, emphasises gradedness, and expresses no morphological bias. Developing Drozd & Seibicke's inclusion of psychological phenomena such as deliberate intention, a clear link can be made to cognitive linguistics indicating that motivation is a complex phenomenon composed of language-internal and language-external factors in complex interplay. Some consequences are, among others:

- The iconic power of forms of representation is user- and context-dependent. For instance, metaphors and initialisms require more background knowledge than morphological devices such as compounds and phrases.
- Motivation is inference-based (according to Wolfgang Dressler as quoted by Myking 1998: 335; cf. relevance theory). In the case of scarce linguistic material (e.g. simplex and/or metaphorical terms), more background knowledge is required to make the necessary inferences: overshot requires more inferences than does fishing tool, cf. table 3 below. In the case of abundant material (compounds and phrases), perhaps less background knowledge is needed, but still, background knowledge cannot be reduced to zero3.
- New terms always carry some sort of motivation (Drozd & Seibicke 1973; Kocourek 1991), and this old statement is still valid. As pointed out by these authors, this amount of motivation may be induced psychologically, i.e. post hoc, by users of the term as well as by means of etymological analysis.
- Motivation is never static: any lexical type may acquire a motivational meaning or lose it (Drozd & Seibicke 1973; Kocourek 1991); this old statement is still valid and closely linked to the previous statement.

The purpose of motivation in neonomy may be described in the following way: motivation should make the neonym easily understandable and meaningful within the context in which it is intended to function, by means of interaction and interplay of linguistic and extra-linguistic mechanisms. These mechanisms may vary from context to context (domains can be viewed as contextually bound), and different motivations may be needed in different contexts.

This is by no means a completely new position. Ullman (1972: 93) had already pointed to the fact that for a word to be motivated, it must be felt to be motivated. If this position holds true, there is no reason why motivation should not be extended to include a wide variety of types other than compounds and derivatives along the lines pointed out by Kocourek 1991 and demonstrated in his model (cf. above). It does not, however, make the classification task proper any easier, as we shall very soon have to account for a variety of psychological phenomena, including the problem of post hoc analysis. To give a full account of such problems would exceed the limits of this article.

PROPOSAL: THREE MAIN TYPES OF MOTIVATION

The discussion so far has demonstrated the difficulties of establishing a consistent and all-embracing definition of motivation, a problem that has been resolved by taking recourse to the principle of gradedness. If we return to question 1 in the introduction, the task of making classifications might, as a consequence, be seriously questioned: For what purpose do we need classifications? Do we really need them, especially when the inevitable problems of inconsistencies and fallacies are taken into account?

One obvious answer would be that gradedness often provides a more adequate and complete understanding of a phenomenon in question, but, nevertheless, that taxonomies are often required for analytical purposes (contrastive, diachronic etc.). After all, classification is part of any scientific approach. Semiotic parameters and word-forming mechanisms must, consequently, be connected in one way or another. Kocourek's model is a first attempt in this direction, and I attempt a further step by suggesting a revised taxonomy of motivation types based on Kocourek's model, cf. figure 3 below.

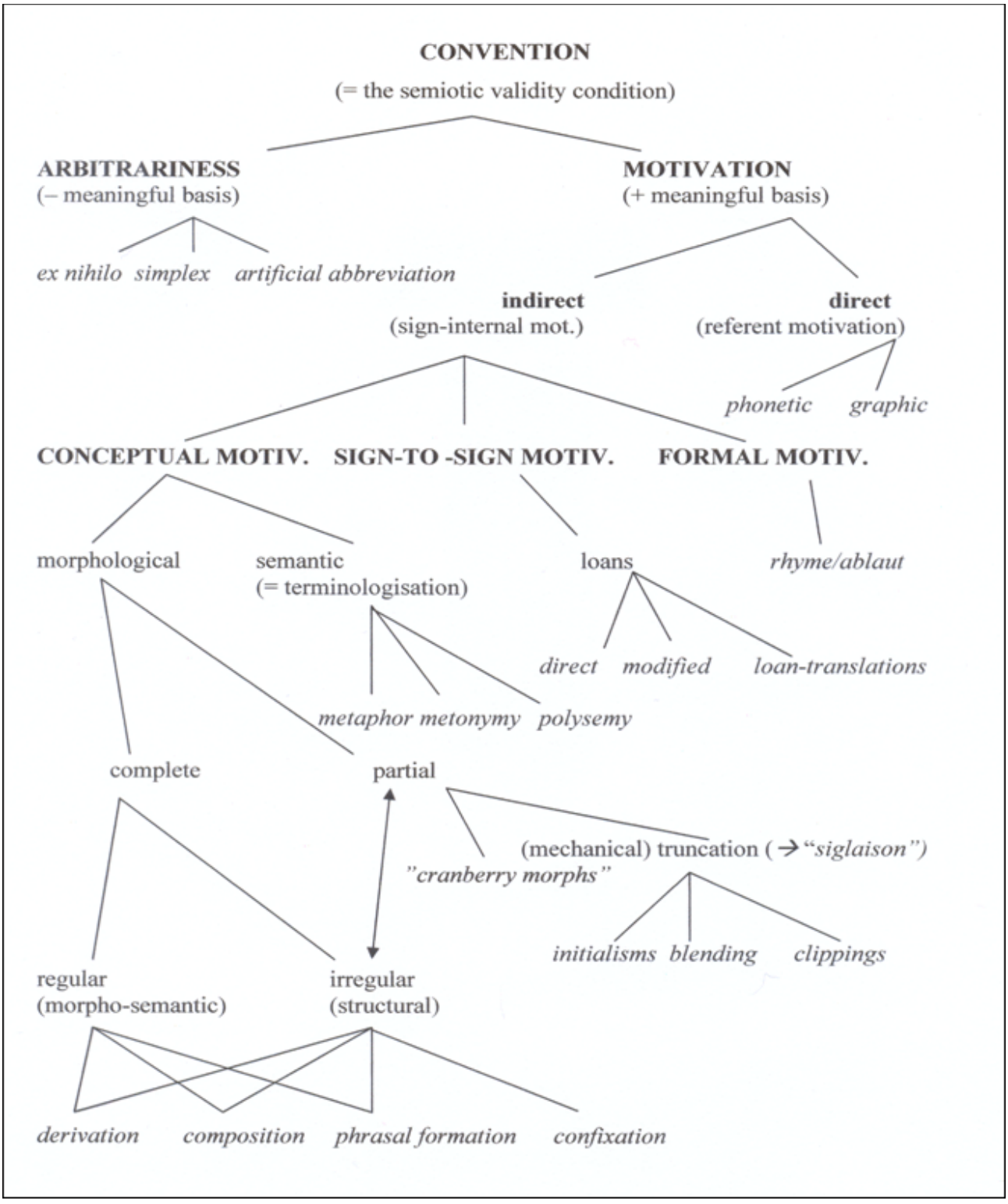

Figure 3: An extended taxonomy of motivations (cf. Myking 2008: 344. The double arrow indicates an instance of possible overlap.)

The point of departure for the proposed taxonomy is Kocourek's next-to-top level dichotomy of arbitrariness and motivation as hyponyms of convention. 'Convention' is seen as the semiotic validity condition, 'arbitrariness' refers to formation lacking a meaningful basis, whereas 'motivation' covers all types of formation for which a meaningful basis can be identified. The level of motivation is then covered by three major types:

- Conceptual motivation --> morphological & semantic formation, according to tradition.
- Sign-to-sign motivation --> cross-linguistic bases, loans, according to Kocourek 1991.
- Motivation by form --> phonaestetic phenomena; again according to tradition.

The model is structural and static, and the problem of how to deal with the dynamic and creative aspects of term formation remains unsolved. The present article does not permit a broad account of all details and arguments leading to this typology, and therefore I have to refer to Myking 2008. For taxonomic purposes, the model is intended, however, to provide a more detailed account of term formation than previous models.

It is also important to notice that this kind of taxonomisation adresses motivation from the semasiological point of view only – it does not deal with motivation in the functional, normative, and onomasiological senses, nor with 'motivated choices'. We are trying to classify term-forming mechanisms with regard to motivation, not the degree of motivation that can be attributed to particular terms. The point is, however, that correlations of the semasiological and the normative approaches should be made on the basis of reliable taxonomies.

A first glance at the proposed model indicates that the motivation types sign-to-sign and form appear marginal because they do not seem to cover a wide range of lexical types. This is only partly true, considering the important role of loans interacting with morphological procedures, for instance when a source term is transferred and then replaced by a morphologically complex target term. In a model of this kind, the scientific importance of one single motivation type, such as metaphor, may appear limited when included in a complex set along with a number of other types. The main focus is, after all, on conceptual motivation, encompassing morphological as well as semantic motivation. The main differences with regard to communicative function and to paradigmatic importance can be referred to this contrast and this section of the model. As demonstrated by the discussion above, this opposition is in fact the essence of the problem. The main reason for this is that they both affect two main functions of terminology formation – the function of concept formation and the function of concept transfer. Both functions are served by term formation, primary vs. secondary term formation respectively. This interdependence requires some additional comments.

PRIMARY VS. SECONDARY TERM FORMATION

One important reason behind conflicting views on motivation is the position of morphological vs. semantic motivation with respect to their functions within primary and secondary term formation. When assessing the importance of a motivation type, a number of pragmatic considerations must be taken into account. First of all, as mentioned above, it is important to recognise that the message conveying the potential of motivation types varies, and that different forms of representation have different iconic power vis-à-vis different user groups and within different (technolect) domains. We may put forward the following suggestion and hypothesis:

- The potential of motivation is dependent, to a large extent, upon the main functions of primary vs. secondary term formation. The two main types of term formation exploit the potential of motivation in different ways, corresponding to two interdependent, but conceptually different needs – cognition vs. communication.

The pragmatic distinction between primary and secondary term formation is attributed to Sager (1990):

> Primary term formation accompanies concept formation and is therefore monolingual [...] Secondary term formation occurs when a new term is created for a new concept and happens in two distinct situations:
> 1) as a result of monolingual revision of a terminology, e.g. for the purpose of producing a standards document, or
> 2) as a result of knowledge transfer to another linguistic community which is carried out by means of term creation (Sager 1990: 80)

Primary term formation is linked to *conceptualisation* and emergence of new knowledge, and thus to metaphorical motivation, since we accept that metaphorical concept formation is perhaps the primary way of arriving at new knowledge (cf. Temmerman 2000).

Secondary term formation, on the other hand, is linked to terminology revision and transfer. Such communicative needs largely affect the expression level and are perhaps best served by morphological motivation. Morphological motivation is more context-resistant (unmarked, "objective") and this permits a safer interpretation of characteristics; cf. maxims of clarity, relevance, manner, and quality (cf. Laurén & al. 2008, Ch. 7, 8). To quote the pair of derrick vs. Norwegian boretårn once more, the latter focuses on the main function to be performed by the apparatus and does not evoke any connotations about persons carrying the name of Derrick. This is nothing more than the traditional insight provided by writers within the 'tradition'.

Whereas primary term formation accompanies concept formation and lacks any previous linguistic model, according to Sager (op. cit.), secondary term formation is "designed and engineered", and there is always "the precedent of an existent term with its own motivation". Secondary term formation is, as a consequence, not possible without motivation, but this motivation may in some instances be 'negative', such as when it becomes a norm to deliberately avoid transferring the source model to the target language. This is one mechanism leading to 'demetaphorisation', as indicated below.

The two types of secondary term formation, revision and transfer, have one factor in common, that of deliberate human effort, and there is no need to exclude either type from the discussion, even if the plurilingual type has been at the focus of discussion so far.

'DEMETAPHORISATION': A MOTIVATED PHENOMENON

The previous points can be summarised in the following way, cf. table 2:

PRIMARY TERM FORMATION	SECONDARY TERM FORMATION
cognition	communication
generation of new knowledge	transfer of existing knowledge
spontaneous term formation	conscious and deliberate term formation
no previous model	existing model
metaphorical motivation	morphological motivation

Table 2: Main features of primary vs. secondary term formation

On this basis, the following predictions can be made: In a bilingual set of terms in which one of the languages is the language of secondary term formation, the source/primary terminology is likely to be less characterized by regular morphological motivation than its equivalent target/secondary terminology. Conversely, the target secondary terms are likely to be characterized by a higher frequency of morphological motivation, a fact that can be explained by normative and conscious efforts in term creation. The process of transfer is a motivating, langue-independent factor (cf. Radden & Panther 2004) leading to "demetaphorisation", i.e. a process whereby metaphorical terms are replaced by more transparent morphological compounds, precisely because in this process, the main characteristics are focussed and connotations omitted. Cf. the following examples from the domain of oil exploration and drilling:

SOURCE TERM (English)	TARGET TERM (Norwegian)	LITERAL TRANSLATION
bean	*reduksjonsventil*	"reduction + valve"
Christmas tree	*ventiltre*	"valve + tree"
derrick	*boretårn*	= ellipsis of *drilling derrick*"
doghouse	*vaktbu*	"watch + cabin"
fatigue	*materialtrøtthet*	"material exhaustion"
jacket	*plattformfot*	"platform + foot"
kelly	*drivrør, rotasjonsrør*	"drive + pipe", "rotation + pipe"
kick	*tilbakeslag*	Literally . "backlash"
monkey board	*tårnplattform*	" derrick platform"
moonpool	*kjellerdekkshull*	"cellar + deck + hole"
mousehole	*rørkoplingshylse*	"pipe + joining + hole"
overshot	*fiskeredskap*	Cf. *fishing tool*
rathole	*drivrørshylse*	"drive + pipe + hole"
roughneck	*boredekksarbeider*	"drilling floor worker"
roustabout	*dekksarbeider*	"(drill) floor worker"
wild cat	*undersøkingsbrønn*	Cf. *exploration well*

Table 3: Secondary term formation and demetaphorisation

The phenomenon exhibited by the above data probably applies to any technolect, although neither in a deterministic nor even statistically dominant way. However, the pragmatic and cultural significance of this tendency underlies discussions on secondary term formation in many languages and in many writings on terminology. To the extent that the tendency is significant, demetaphorisation should be considered a motivated feature of secondary term formation. Typological and normative explanations have been suggested, but the tendency is better explained as the product of an iconic drive created by the transfer context.

Whether or not this suggestion is feasible can only be established by means of empirical and typology-based research, but it should be borne in mind that a large degree of asymmetry exists between any two parallel and equivalent terminologies that are compared. To account for metaphor in a typological perspective, separate and equivalent sets of primary term formation are needed. This is a requirement not easily met.

SOME CONCLUDING REMARKS

If the two important subtypes of conceptual motivation, morphological vs. semantic motivation, constitute the core of the problem of creating a meaningful taxonomy, it follows that large parts of the model proposed here are neutral with respect to 'paradigmatic' discussions between directions of terminology.

As regards sign-to-sign or cross-linguistic motivation, it can be concluded that the existence of secondary term formation demonstrates that motivation cannot be adequately dealt with within a strictly monolingual context. This type of motivation is indeed complex and at the same time interacting with conceptual motivation in a large number of cases. A secondary term exhibiting the morphological structure of a compound is at the same time conceptually as well as cross-linguistically motivated, and it is often difficult to decide which motivation is the most important, cf. Norwegian froskemann < English frogman. Two other instances of cross-linguistic motivation, Latin nomenclature and abbreviations, which in this model have been classified as partial morphological motivation, are more resistant to motivational change than are metaphors, i.e. they are more often transferred directly or with minor adjustments.

As regards the third main type, formal motivation, the model indicates a status equal to that of conceptual motivation, although there is very little evidence in research that could at present refute Drozd & Seibicke's (1973: 129) statement that this type is insignificant in LSP and terminology.

It may be questioned whether models such as Kocourek (1991) or the present model really solve the "catalogue problem" mentioned in the introduction to this paper – term formation as a set of lexical categories that are not exclusive to terminology and LSP. On the other hand, focussing on motivation types instead of lexical types is making a generalisation that addresses the driving forces behind lexical growth rather than its outcome. Nevertheless, any taxonomy or classification will have to prove its significance first of all by fulfilling descriptive needs and not by striving towards the ambition of resolving the overall indeterminacy of the concept of motivation.

Since the discussion has ranged over different aspects of motivation and since the issue of different views on motivation has not, so far, been investigated in detail, there seems to be no need to over-emphasise the 'parametrical' status of motivation, that is, in the sense that motivation be a sign of demarcation between directions of terminology. My view is that there seems to be agreement on the importance of motivation at a very general level, and that the choice of object of study is often a matter of personal inclination and of the contextual setting of terminology in which the researcher finds himself or herself.

There is, finally, no logical implication arising from the proposed model for the study of secondary term formation to be a normative task. Investigating the merits of motivation in secondary term formation might require different methodologies than do research in primary term formation, although this is by no means self-evident. Temmerman states that her investigations based on cognitive linguistics are based on primary term formation (in casu: English), but she also states (Temmerman 2000: 235) that cognitive research in secondary term formation is needed. In order to advance further towards a unified view on motivation in terminology, this suggestion should be supported. Such effort might unify the two seemingly antagonistic but in fact compatible perspectives of this discussion: cognitive terminology might include functional perspectives on metaphor, and traditional terminology might benefit from a description of compounds and derivatives from the cognitive perspective.

[1]This article is based on previous work: The main topics of dichotomisation are discussed in Myking 1998, the main ideas of which are elaborated in Myking 2008. The essential semiotic definitions are given in Laurén & al 2008.
[2]The English term is in fact formed by ellipsis of drilling derrick and the semantic motivation of the generic term derrick by the proper name of Derrick is perhaps accessible only by etymological analysis.
[3] This may not always be the case, as lengthy terms may result from a high level of abstraction and used only in expert-to-expert communication (Margaret Rogers, personal communication).

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Birthe Toft
Institute of Business Communication and Information Science
University of Southern Denmark
Kolding

MOTIVATION OF ENGLISH AND DANISH MEDICAL TERMS – A CONTRASTIVE ANALYSIS

Abstract

This article analyses and discusses forms of motivation in a number of English-Danish term pairs selected from the corpus of English and Danish medical terms found in SNOMED, a nomenclature of medical terms widely used and recently translated / adapted for the Danish health care sector. Apart from comparing and discussing forms of motivation, the article describes and discusses the influence exerted by the Board of the Sundterm Project in the process of finally deciding on the Danish preferred term, an issue which is of particular interest in countries which, like Denmark, have a very short tradition of conscious terminology planning.

INTRODUCTION

A large number of Danish clinical terms have been reviewed and modified over the past four years in the framework of the Sundterm Project, conducted by the Danish National Board of Health. The aim of the project was to create a Danish version of SNOMED, an American/British nomenclature of clinical terms. This constituted the first effort at conscious terminology planning at state level in Denmark, the only proper kind of terminology planning, according to Antia (2000).

The Danish version of SNOMED will be used in the future as a reference tool for the electronic health record system planned by the Danish regions. At the same time it is in the process of being implemented in large parts of the Western world, which will permit the exchange of health record data across borders and systems.

I participated in the project in question as a terminology consultant and member of the Project Board. The Board consisted of about 10 members, one half subject specialists and the other half linguists/terminologists. It met every two weeks to decide on overall terminological principles as well as on issues and/or disputes arising out of the practical translation and validation process which took place during the period 2005 – 2009.

As a result, I have access to SNOMED's approximately 280,000 English-Danish term pairs, complete with conceptual data, as well as to the records of decisions leading to the final choice of a large number of Danish terms. Against this background, I wish to analyze and compare a number of selected English-Danish term pairs from a motivation point of view.

I find term motivation one of the most intriguing issues in terminology, one that had not been subject to much theoretical debate until the appearance of Myking's 2008 thesis Motivation as a principle of term formation (my translation of the title), which has been my primary source of inspiration.

On this background, for the pairs of clinical terms selected I shall discuss, the following issues:

1. What types of motivation are found in the Danish preferred terms and their English equivalents?
2. How did the principles, guidelines, and individual decisions of the Sundterm Editorial Board influence the choice of type of motivation of the Danish preferred term in each case?

In Section 1, I shall characterize Danish medical terminology as it was described in Høy 1998 before any conscious planning efforts had been made. Section 2 provides some background information on the

original American/British terminology found in SNOMED. Further, it introduces the concept hierarchies of SNOMED and the criteria according to which my term pairs were selected.

Section 3 contains a brief description of the principles and guidelines according to which the Sundterm Project Board made its decisions as to the choice of Danish preferred terms. In Section 4, for each term pair selected the motivation of the Danish and English preferred terms will be analyzed and discussed. In addition, for each Danish preferred term I shall describe the criteria applied by the Board in its decision to prefer it to other term candidates.

Finally, in Section 5, I shall sum up on the overall influence exerted by the Sundterm Project Board in respect of the choice of Danish preferred terms.

Throughout the paper, square brackets [..] will be used for translations of terms, whereas conventional brackets (..) will be used for indicating the conceptual content or full form of terms.

1 DANISH MEDICAL TERMINOLOGY BEFORE THE SUNDTERM PROJECT

Before the conscious terminology planning effort of the Sundterm Project, according to Høy 1998 Danish clinical terminology was characterized by two partly contradictory tendencies:

- an increasing degree of nationalization or 'de-classicalization' as a result of the lack of knowledge of classical languages on the part of health care professionals
- increasing influence exerted by English i

Thus by the time the Sundterm Project was initiated, Danish medical terminology consisted roughly of

1. Native Danish terms, including 'folk terms' (Myking 2008:95), such as lårbenshals [neck of femur], fåresyge [mumps], and sukkersyge [diabetes]
2. 'Learned' terms created via 'confixation' on the basis of Latin or Greek morphemes or words (Myking 2008:211), such as diabetes mellitus malnutritionis [diabetes resulting from malnutrition] and neoplasma benignum renis [benign tumor of kidney]. Many of the terms were internationalisms, and many were used in grammatically incorrect forms
3. Terms resulting from secondary term formation processes in connection with transfer of knowledge from other languages (Myking 2008:124), i.e. loan forms (Myking 2008:170) such as bypass [bypass] and Downs syndrom [Down's syndrome]

Apart from a 'diagnosis' of Danish medical terminology, Høy 1998 contained a number of suggestions for improving it. When Asta Høy became the chief terminology consultant of the Sundterm Project in 2005, most of her suggestions were actually adopted and subsequently amended and/or supplemented by the Editorial Board, whose meetings were also presided over by her for the duration of the project.

The sources from which the Board excerpted existing Danish medical terminology were a number of machine-readable corpora of medical texts, selected by Danish National Board of Health specialists and terminologists. Besides, the Board regularly consulted subject matter experts from outside.

2 SNOMED AND ITS AMERICAN/BRITISH TERMINOLOGY

The result of a joint development effort between the UK National Health Service and the College of American Pathologists, the SNOMED interface terminology started out as a pathology-centered vocabulary and grew into a comprehensive clinical terminology of approximately 350,000 concepts.

The mixed origin and parentage of the American/British terminology were clearly reflected in a number of terminological weaknesses, including a poor degree of systematicity and well-motivatedness in some sub-hierarchies, as well as a number of irrelevant veterinary concepts, most of which have, however, been rooted out by now. Since 2007, the American/British terminology has been subject to constant review and improvement by the IHTSDO ii.

SNOMED comprises 19 hierarchies of concepts (see table 1 below), the most comprehensive of which are body structure, which includes all of human anatomy, clinical finding, which includes all diseases, and procedure, which comprises actions performed by health care professionals.

HIERARCHY	EXAMPLES	PERCENTAGE OF TOTAL NUMBER OF CONCEPTS	COMMENTS
Body structure	*underarm* [forearm]	**10%**	
Clinical finding	*deformitet af auricula* [deformity of pinna]	**35 %**	
Environment or geographical location	*ergoterapiklinik* [occupational therapy clinic]	**>1%**	
Event	*eksponering for potentielt skadeligt emne* [exposure to potentially harmful entity]	**3%**	
Linkage Concept	*associeret fund* [associated finding]	**3%**	System-specific concepts
Observable entity	*generel immunstatus* [general immune status]	**2%**	
Organism	*Oomycota* [phylum Oomycota]	**10%**	Many concepts belong to inter-national nomenclatures
Pharmaceutical/biologic product	*alkoholholdigt lokalanæstetikum* [alcoholic local anesthetic]	**6%**	
Physical force	*ioniserende stråling* [ionizing radiation]	**>1%**	
Physical object	*injection device* [injection device]	**1%**	
Procedure	*kontinuerlig hæmodialyse* [continuous hemodialysis]	**17%**	
Qualifier value	*klinisk onkologi* [clinical oncology]	**>1%**	
Record artifact	*record entry*	**>1%**	System-specific concepts. Few terms have been given Danish equivalents
Situation with explicit context	*prænatale risikofaktorer* [antenatal risk factors]	**2%**	
Social context	*medlem af de væbnede styrker* [military service member]	**2%**	
Special concept	*abnorme laboratoriefund* [laboratory finding abnormal]	**>1%**	
Specimen	*knoglemarvsprøve* [bone marrow specimen]	**>1%**	
Staging and scales	*cancerstadieinddeling* [cancer staging]	**>1%**	
Substance	*enzyminhibitor* [enzyme inhibitor]	**7%**	

Table 1: SNOMED hierarchies

Each SNOMED concept is represented by a so-called fully specified name, a preferred term, and in most cases at least one synonym (see Table 2 below). The fully specified names consist of the preferred term plus the name of the relevant subhierarchy. Danish equivalents were found for the preferred terms only.

Fully specified name	Preferred term	Synonym
bone marrow structure (body structure)	bone marrow structure	haematopoietic marrow; haematopoietic tissue; bone marrow

Table 2: How a concept is represented by terms in SNOMED

In the three largest hierarchies mentioned above, one finds the terms that are the most central to clinical practice. 10 out of the 12 term pairs I have selected belong to those hierarchies.

However, the term pairs were selected primarily because the Danish preferred terms span Myking's typology of motivation (2008:344, see Figure 1) in the sense that they represent a broad range of types of motivation.

Only one example of direct motivation in a Danish term is presented (see term pair 1). The types of indirect motivation represented go from direct loan motivation via metonymic motivation to morpho-semantic motivation. The latter type is often assumed to result in maximum transparency, a piece of conventional wisdom questioned by Myking (2008). I shall comment on this in my concluding section.

3 GUIDELINES AND PRINCIPLES LAID DOWN BY THE PROJECT BOARD

A number of linguistic and other terminological principles and guidelines, based mainly on Høy 1998, were established at the beginning of the project period and continuously updated by the Project Board, working in meetings as well as online between meetings. The principles and guidelines relevant to the present theme are:

1. Danish terms should be used where possible, English loan words being the 'last resort'
2. Full-form Latin/Greek anatomical terms were to be accepted
3. Other Latin/Greek terms were to be replaced by so-called hybrids. In Myking's typology they would be called 'clippings', i.e. mechanically truncated terms from which Latin or Greek inflectional suffixes have been removed. Thus instead of pneumonia and otitis, we had to choose, and in some cases create, terms like pneumoni and otit, respectively
4. There was to be a bias towards established usage, balanced vis-à-vis

    a. well-motivatedness in the sense of transparency
    b. language economy, and
    c. systematic term formation

5. Terms for concepts approved by the National Council of Health Concepts iii and terms found in the Danish Dictionary of Clinical Terms (Nørby 2005) were to be the default authoritative references.

According to Asta Høy (2000:11), hybrids are good quality terms since the majority of them are potentially unambiguous, linguistically economical, internationally recognizable, and psychologically acceptable to users, a claim based on her survey in Høy 1998. In other words, the preference for hybrids (principle 3) is basically in accordance with principle 4.

The Board was fully aware that conflicts would inevitably arise among the other principles, especially between principles 4a, 4b, and 4c. My analysis of the term pairs in what follows clearly indicates that such conflicts did arise. It also shows that in solving them, the Board did not always apply its own principles and guidelines in a consistent way.

4 ANALYSIS AND COMPARIDON OF ENGLISH AND DANISH TERM PAIRS

I shall analyze and compare the motivation of the 12 term pairs below on the basis of Myking 2008, in particular his typology of motivation (Figure 1).

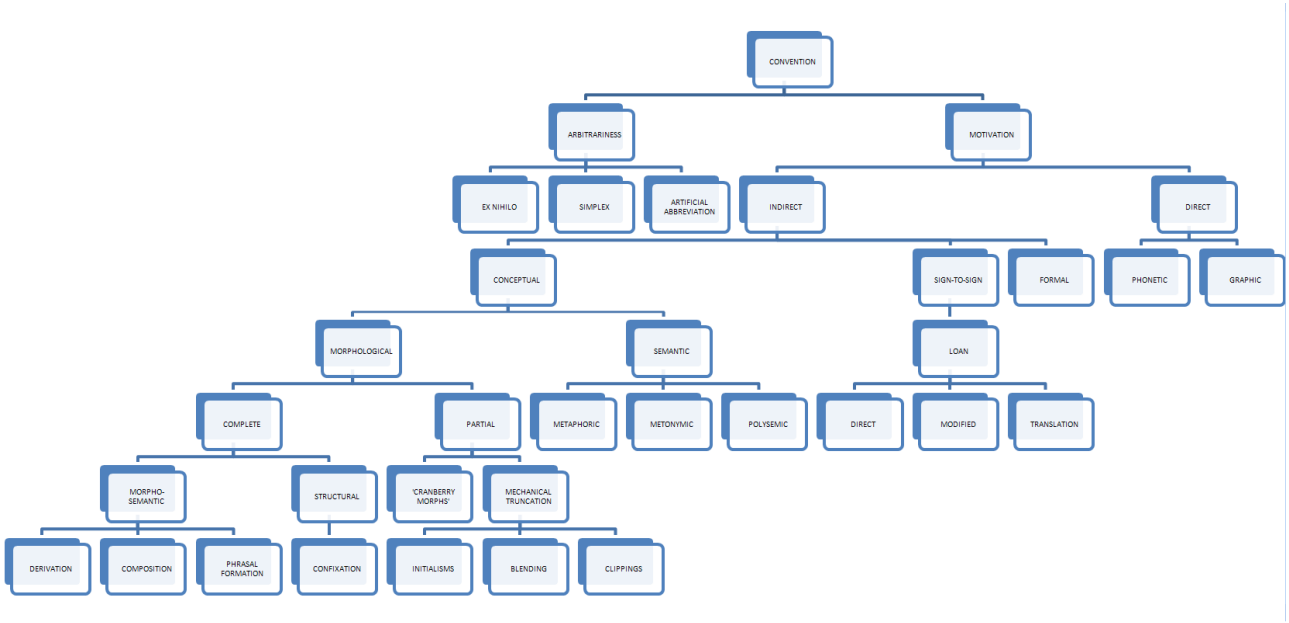

Figure 1: Typology of motivation (Myking 2008: 344). Note that lines are missing between structural motivation and the three types under morpho-semantic motivation, a case of multiple inheritance.

As was mentioned in section 2, indirect motivation is found in all term pairs except term pair 1. Thus for term pairs 2 – 12, I shall simply indicate the specific type of indirect motivation, adding the broader category of indirect motivation in parentheses.

Having analyzed each pair, I describe the degree to which the principles and guidelines of and the decisions made by the Editorial Board have influenced the choice of motivation of the Danish preferred term.

Preferred term		Hierarchy	Type of motivation
DA	*bukseprotese* [trouser prosthesis]	Procedure	Graphic (direct)
EN	*Y-graft* [bifurcation graft]		Graphic (direct)

Table 3: term pair 1

Direct motivation is based on the form of the referent. In this case, the motivation of the Danish preferred term is based on iconicity with a physical object, whereas the motivation of the English preferred term is based on iconicity with a linguistic sign, which means that it is somewhat paradoxical to talk about direct motivation (Myking 2008:163).

In the choice of the Danish preferred term, usage was given priority.

Preferred term		Hierarchy	Type of motivation
DA	*ERCP*	Procedure	Direct loan of initialism
EN	*ERCP* (Endoscopic Retro grade Cholangio Pancreatography)		Initialism (mechanical truncation)

Table 4: term pair 2

Initialisms are not transparent terms, and even less so if they transferred from other languages in the form of direct loans. Nonetheless, a good deal of such direct loans have been approved.

In this particular case, as in numerous others, usage was given priority in the choice of the Danish preferred term on the grounds that the term was 'widespread and well-known in clinical practice'.

The choice was made in spite of the fact that the Danish Dictionary of Clinical Terms recommends a morpho-semantically motivated term: endoskopisk, retrograd kolangio-pankreatikografi, a term which is a direct equivalent of the full form of the English term.

Preferred term		Hierarchy	Type of motivation
DA	*DAMP*	Clinical finding	Direct loan of initialism
EN	*Deficits in attention motor control and perception*		Composition (morpho-semantic)

Table 5: term pair 3

Whereas the English preferred term is a full form, the Danish preferred term is a direct loan of an initialism, i.e. a mechanically truncated form of an English synonym of the preferred term.

The term is listed as a primary entry in the Danish Dictionary of Clinical Terms, and in addition it was argued that the term has become so widely accepted both by experts and laymen that changing it would have no effect even though it is by no means transparent.

Preferred term		Hierarchy	Type of motivation
DA	*Gunns symptom* [Gunn's symptom]	Clinical finding	Metonymic (semantic)
EN	*jaw-winking syndrome* (symptom in patients with congenital (usually one) hanging upper eyelid, the nerves of which do not function properly; consequently the eyelid will lift when the patient chews or swallows)		Composition (morpho-semantic)

Table 6: term pair 4

In accordance with principles 1 and 4, the Board had decided to avoid metonymically motivated terms as far as possible. Metonymic motivation seldom results in transparent terms; nonetheless, it is quite widespread in medical language, possibly as a result of the terms being somehow 'remarkable', cf. Section 5.

This term was chosen because it is listed as a primary entry in the Danish Dictionary of Clinical Terms. Moreover, this was in accordance with established usage.

Preferred term		Hierarchy	Type of motivation
DA	røntgenundersøgelse [Röntgen examination]	Procedure	Metonymic (semantic)
EN	radiology (the examination or photographing of organs, bones, etc. with x-rays or nuclear radiation)		Derivation (morpho-semantic)

Table 7: term pair 5

The English preferred term is clearly more transparent than the Danish one, which is, however, firmly entrenched in practice. Surprisingly, the Danish Dictionary of Clinical Terms does not contain the term as an entry. On the other hand, a number of compound term entries contain the modifying element Røntgen.

A decision was made to give priority to long established usage in spite of the fact that a morpho-semantically motivated Danish term could have been created in analogy with other terms comprising the adjective radiologisk (radiological).

Preferred term		Hierarchy	Type of motivation
DA	*familiær amyloid polyneuropati, Jewish type*	Clinical finding	Loan, the initial part modified and the final part direct
EN	*familial amyloid polyneuropathy, Jewish type* (disease often found in Jewish part of population)		Composition (morpho-semantic) + metonymic (semantic)

Table 8: term pair 6

An example of metonymic motivation is found in the postmodifying element of the English preferred term. In spite of its above-mentioned decision to avoid metonymically motivated terms, the Board decided to simply transfer this element to the Danish preferred term. Thus transparency was sacrificed in order to avoid a politically incorrect term referring to ethnicity.

Part of the rationale for this decision was the assumption that the term would seldom be used in Danish clinical practice, a circumstance which would often motivate the Board not to put too much effort into creating Danish terms.

Preferred term		Hierarchy	Type of motivation
DA	*sundhedsperson* [health person]	Social context	Composition (morpho-semantic)
EN	*health care provider*		Composition (morpho-semantic)

Table 9: term pair 7

The English term is more transparent than the Danish one, in which the characteristic 'care-giving' has been left out. No term can represent all the characteristics of a concept, so some kind of ellipsis will always occur as a kind of pragmatic solution to the demand for 'motivational economy', according to Myking (2008:201).

Actually the term was not up for debate in the Board, since according to principle 5, terms created by the Danish National Council of Health would have to be accepted without question. Nevertheless, such terms often created a good deal of debate among Board members, and this was one of them.

Preferred term		Hierarchy	Type of motivation
DA	*parotit* [hybrid form of parotitis]	Clinical finding	Clipping (mechanical truncation)
EN	*mumps* (origin: the verb mump = mumble, sulk?)		Metaphoric (semantic) or ex-nihilo (arbitrariness)?

Table 10: term pair 8

The motivation of the English preferred term is a matter of debate: is there a metaphoric relation between mumps and the verb to mump? Webster's Online Dictionary seems to imply that there is. If no semantic relationship exists, ex nihilo-motivation – grouped under lack of motivation or arbitrariness - may be relevant in this case as well.

As to the choice of Danish preferred term, it followed from the principle established by the Board to use hybrid Latin/Greek forms of children's diseases in the disease hierarchy. In other hierarchies, the 'folk term' fåresyge [sheep's disease] may be used, e.g. in connection with vaccination.

Preferred term		Hierarchy	Type of motivation
DA	*venstre ventrikels output* [output of left ventricle]	Observable entity	Phrasal formation (morpho-semantic)
EN	*left ventricular blood flow*		Phrasal formation (morpho-semantic)

Table 11: term pair 9

As a result of the English loan word, the Danish preferred term may seem slightly less transparent than its English equivalent, even though the word output is hardly perceived as a loan word in Danish any longer.

The choice of the Danish preferred term was made because the Board had previously decided to use output in Danish terms in specific contexts describing physiological functions, in particular those of the heart. Actually, it turns out that virtually all occurrences of the word in Danish preferred terms collocate with cardiac.

Preferred term		Hierarchy	Type of motivation
DA	*pneumoni forårsaget af Legionella micdadei* [Pneumonia caused by Legionella micdadei]	Clinical finding	Phrasal formation (morpho-semantic)
EN	*Pittsburg pneumonia*		Metonymic (semantic)

Table 12: term pair 10

The Danish preferred term was chosen as a result of the decision to avoid metonymically motivated terms as far as possible, as well as the decision to create transparent Danish terms contributing to the systematicity of the relevant hierarchies. Thus the Board had decided to use the phrase forårsaget af (caused by) as the equivalent of due to, and as a result some 50 terms in the Clinical Finding hierarchy comprise the phrase.

Preferred term		Hierarchy	Type of motivation
DA	*diæt ved strålebehandling* [diet in connection with radiation treatment]	Clinical finding	Phrasal formation (morpho-semantic)
EN	*radiation diet*		Phrasal formation (morpho-semantic)

Table 13: term pair 11

The Danish preferred term was chosen with the objective of furthering transparency as well as of maintaining the degree of systematicity, although as it turns out only 6 terms actually comprise the phrase diæt ved.

The term is more transparent than its English equivalent, which is an example of ellipsis as a result of the need for language economy, cf. term pair 7.

Preferred term		Hierarchy	Type of motivation
DA	*fikseringsanordning* [fixating device]	Physical object	Composition (morpho-semantic)
EN	*caliper* (tong-shaped instrument of fixation, used for supporting other body parts, such as the legs. Caliper = measuring device consisting of long, thin pieces of metal joined together)		Graphic (direct)

Table 12: term pair 13

Whereas the English preferred term is not exactly transparent, the Board chose a morpho-semantically motivated Danish term with the objective of furthering transparency. Incidentally, the word device gave the Board a good deal of problems because a number of equivalents exist in Danish, so no clear guidelines could be established.

5 Summing up

Based on my very small exploratory analysis, it seems that usage carried the day in many Board decisions, especially as far as the potential conflict between usage on the one hand and transparency and systematicity on the other hand was concerned, in other words, principles 4a as opposed to 4b and 4c. In my opinion, this circumstance reflects the balance of power existing between clinical practitioners and linguists/terminologists in the Board.

As terminologists, we tend to prefer morpho-semantically motivated terms because we assume that they possess maximum transparency. Myking has called this our 'morphological bias' (1997: 329). In Myking

1997 as well as Myking 2008, the validity of this claimed bias is questioned, and it is pointed out that transparency need not be equated with morphological transparency.

According to Myking 2008, Wüster did not use the term 'motivation' in his most important writings. Instead, he talked about Merkhilfe, which can be construed as any characteristic of a term making it easy to remember. Of course this means first of all 'easy to understand or infer the meaning of', but there is also an element of 'remarkable' in the concept of Merkhilfe. Myking puts it this way (my translation):

> It is not unthinkable in principle for an expression with a 'marked' form to be both easy to notice and at the same time easy to remember, even if one did not understand its meaning (2008: 56)

In sum, clinical practitioners and others who do not necessarily agree with terminologists that terms should preferably be morpho-semantically motivated will find some support not only in Myking, but even in Wüster.

Perhaps metonymically motivated terms such as Gunns symptom (term pair 5) and røntgenundersøgelse (term pair 6) are simply 'remarkable' in the sense described above, making them as successful as they clearly are. I think that the guidelines and principles to be established for future terminology planning projects should try to take such apparent paradoxes into account.

[I] Høy did not apply the term domain loss, which a few years later would be applied to characterize the situation not only in the medical domain, but in most domains (Laurén et al. 2003).
[ii] The International Health Terminology Standards Development Organization, situated in Copenhagen, is now responsible for developing SNOMED. At its homepage, you may also find information about SNOMED, see http://www.ihtsdo.org/
[iii] The Health System Concepts Database established by the National Council of Health Concepts (Det Nationale Begrebsråd for Sundhedsvæsenet) - see http://begrebsbasen.sst.dk/

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