THE ROLE OF COGNITIVE THEORY IN TRANSLATION OF METAPHORICAL SCIENTIFIC TERMS

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Abstract. *My aim is to have a closer look at the benefits of a cognitive linguistic approach to scientific discourse, its metaphorical terms and their translation. This area of research has emerged over recent decades. What role do metaphors play in science and terminology? Why do metaphors appear in scientific terms? The reasons are cognitive. My approach is based on the findings of cognitive linguistics about the significance of metaphor in thought and language, and my own translation and interpreting experience. Metaphor has been recognised as a basic technique of reasoning that is also manifest in terminology, which is an important area of meaning construction. Theoretical conclusions are drawn, applying the tenets of Cognitive Linguistics, translation theory, semantic and stylistic analyses of the empirical material, which I have chosen from my own archive of metaphorical terminology and my glossaries of simultaneous conference interpreting. Translation of metaphorical scientific terminology falls within the realm of Applied Linguistics, which is an interdisciplinary field, drawing on a number of disciplines apart from linguistics. Applied Linguistics calls for a theoretical understanding of language in use to meet user needs. It is not an end in itself as it has practical worth and application.*
Keywords: *metaphor, Applied Linguistics, Cognitive Linguistics, scientific terminology, translation theory.*

Introduction

Applied Linguistics is "a coherent activity which theorizes through speculative and empirical investigations of real-world problems in which language is a central issue" (Davis & Elder, 2004, 11). Grabe calls Applied Linguistics an emerging discipline for the twenty-first century (Grabe, 2002, 3–12). I believe that Applied Linguistics has a great future. Its potential is as yet far from exhausted.

One new applied area of research is translation of metaphorical terms both in the theory of metaphor and in translation studies. It calls for comprehension of the basic tenets of metaphor theory, including figurative meaning as a categorial feature, and of metaphorical conceptualisation: the relationship between metaphor and thought, the role of metaphor in science, and the function of figurative language in scientific terminology. For the purposes of this article I have kept to

the division: arts vs sciences; hence arts terms have been excluded from this analysis. By sciences I understand traditional sciences (e.g., mathematics, physics, astronomy, chemistry, geology et al.) and also much later developments (social sciences, life sciences and the science of law), which, as a rule, are interdisciplinary. For instance, *money laundering* belongs to the science of law. Strictly speaking, it is dealt with by criminology (the scientific study of crime and criminals). Developments over recent decades have revealed how closely it is linked with terrorist financing and disreputable banking practices, which are part of the money laundering process. The aim is to obtain *clean money*, which is a legal term along with *dirty money*. The science of law also covers civil and criminal procedural law. EU directives stipulate all types of legal provisions, civil and criminal procedural measures, and their enforcement (e.g., the Court of Justice of the EU; Europol – the European Union Agency for Law Enforcement Cooperation).

When dealing with my empirical material, I have relied on the method of identifying figurative meaning in discourse (Naciscione, 2010, 43–55; Naciscione, 2001, 33–46), which is a procedure for identifying the metaphorical meaning of a term. In the process of identification, the steps – recognition > verification > comprehension > interpretation – are integral parts of a unified cognitive process. A cognitive linguistic approach to metaphorical language is a tool that helps to perceive, understand and appreciate metaphoricity, and to draw inferences. I follow cognitive psychologists, who claim that language interpretation takes place in real time ranging from the first milliseconds of processing to long-term reflective analysis (Gibbs, 1979, 255).

I have also used the method of interpretative empirical case studies to cope with new metaphorical scientific terms. Empirical study allows me to draw conclusions about their meaning and functioning in scientific discourse.

I follow Talmy in believing that "no single methodology is privileged over others or considered the gold standard of investigation" (Talmy, 2007, xi). One method cannot meet all the challenges for the simple reason that language is a complicated and multifaceted phenomenon.

A cognitive perspective

A cognitive approach to figurative thought and language started with the cognitive turn in linguistics (Lakoff & Johnson, 1980). This breakthrough triggered the application of cognitive research and tenets to various branches, creating new interdisciplinary academic disciplines: Cognitive Psychology, Cognitive Science, Cognitive Neurology, Cognitive Stylistics, Cognitive

Anthropology, and Cognitive Archaeology. These disciplines draw knowledge from two or several fields, promoting thinking across boundaries.

Cognitive linguists and psychologists have proved that the human brain is able to cognise figurative meaning. Moreover, figuration constitutes the way people understand and conceptualise their experience and the external world (Gibbs, 1994, 454). Metaphor has been recognised as a major structure of figurative thought. Importantly, cognitive scientists have proved that the human brain is capable of perceiving and comprehending metaphor online (Gibbs, 1994, 255–256). The metaphorical mapping of information is accessed and processed immediately.

The neural theory of metaphor explains why "metaphorical language takes no longer to process than non-metaphorical language" (Lakoff, 2008, 17). Two areas of neurons function simultaneously, securing comprehension of both the metaphorical and the literal meanings of words. It is only natural that a new scientific discovery leads to the creation of a new concept and a new term, which according to Gallese & Lakoff is "the result of neural activity" (Gallese & Lakoff, 2005, 455), hence neural computation explains cognition.

Metaphor in science

The age of the ICT revolution has led to faster globalisation of information and technologies, creating an increasing need for immediate translation, including metaphorical terminology. The advancement of science and technologies globally generates new discoveries and inventions, which give rise to new concepts and terms.

Metaphorical terms possess a cognitive value of their own. A metaphorical insight helps to grasp the essential features of a phenomenon or process. A multiplicity of metaphorical terms emerges in all branches of science to denote new scientific concepts. They are borrowed all over the world across languages together with new theory, and they all need to be translated as they concern the latest developments. To mention but a few: *orphaned article*, *walled garden, snail mail, netsurfing, bounce message, cobweb site, flame war* (IT); *toxic assets, credit crunch, pattern mining* (economics); *gold plating, standstill clause* (EU); *spin doctor* (PR) and many others. These and numerous other metaphorical terms have no established translation in the Latvian language (LV): no translation is offered by dictionaries or databases.

Metaphor in science has developed into a new fruitful field of research in Cognitive Linguistics (Boyd, 1979; Kuhn, 1979; Hoffman, 1980; Gibbs, 1994, 169–179; Gibbs, 2008). In the cognitive linguistic view, metaphorical terms are theory constitutive metaphors (Boyd 1979; Gibbs, 1994, 172–175). They form an

integral part of both scientific theory and the respective term; hence, the importance of preserving metaphor in the target language whenever possible.

Studies of metaphorical terminology in scientific discourse first and foremost endeavour to meet users' needs in practice. In education, learning the metaphorical way of expression of an abstract thought serves to develop students' reasoning and creativity in the process of acquiring a foreign language. Recognition and comprehension of metaphor in terminology in both foreign language and source language enhance skills and competence in translation and interpreting, which form a vital part of cross-cultural communication.

Translating metaphorical terminology

Figurative language in general – and metaphor as its most powerful pattern in particular – is a challenging area in translation. A cognitive approach helps us to understand the significance of abstract thought and abstract reasoning in the formation of metaphorical terminology, which brings out the role of cognitive theory in translation practice. Metaphorical terms form part of the conceptual system of a language.

Translation of metaphorical terminology belongs to those areas of applied research that involve cognitive abilities: imagination and abstract thinking, which are part and parcel of the art and craft of creation. Creation of a metaphorical term is a cognitive act, as is its translation into another language. A metaphorical translation of a term offers a more insightful and precise understanding of its essence and helps to grasp some outstanding features of the phenomenon or the process.

The pragmatic challenges, however, lie in the choices that have to be made by terminology specialists: to preserve the metaphor or not to preserve it in a novel term in the target language. A variety of approaches are available.

1. *Metaphorical loan translation.* This means that the theory is borrowed together with the metaphorical term. This is an optimal solution for both the specialists who use the term, and for translators and interpreters. In many cases the image of the English metaphor is preserved in the Latvian loan translation. The two scientific fields where this method is most common are computer language and astrophysics, e.g.

EN *a hot start* – LV 'karstais starts'*; to drag and drop* – LV 'vilkt un nomest';

EN *a dark flow* – LV 'tumšā plūsma'; EN *a white dwarf* – LV 'baltais punduris'.

Metaphorical loan translation is easy to use because associations serve as a link, facilitating recall.

2. *Replacement by another metaphor*. This method is used when the original metaphor is not possible in translation for some linguistic or other reason. However, it works as recall is achieved by associations of closeness, e.g.

EN *word wrap* – LV 'vārdu aplaušana' (computer language); EN *vampire energy* – LV 'enerģijas zaglis', which means 'energy thief' in EN. This translation is used in Latvia. The question arises why Latvian terminologists have chosen to use another metaphor when the original metaphor 'enerģijas vampīrs' fully complies with the norms of the Latvian language. Moreover, the EU database *Interactive Terminology for Europe* (IATE), (2004) offers no translation at all. Latvia has established three national bodies which are in charge of terminology, elaborating and standardising it: the Translation and Terminology Centre, the State Language Centre and the Latvian Academy of Sciences Terminology Commission. The latter also has authority to approve the newly translated or newly coined terms, send them to all the important bodies in Latvia: the Parliament, all ministries, publication houses and the media, and publish them in *Latvijas Vēstnesis* ('Latvian Messenger').

3. *Demetaphorisation of the term.* This type of translation is common in Latvian and Italian (according to IATE), resulting in a descriptive, oblique non-metaphorical conceptualisation, e.g.

EN *a pilot project* – LV 'izmēģinājuma projekts' (a test project); EN *wildtype cell* – LV 'normālā šūna' (normal cell).

The metaphorical loan translation of the latter is *savvaļas šūna* (wild cell), which has retained the metaphor; it exists and is used by biology specialists on a regular basis, though it is not an approved term. As the public and most people working in the area use the loan translation, a lack of uniformity arises in Latvian terminology. Thus, two terms are used for the same concept. This creates ambiguity and additional challenges for translators and interpreters.

Loss of a metaphor is not justified if a metaphorical loan translation is possible because loss severs associations, inhibits perception and recognition of the term, hence hindering its back translation and interpretation. Interestingly, Latvian specialists who need these terms in their work on a regular basis use the metaphorical loan. The non-metaphorical term is used only in written form or in an official situation.

The specific circumstances may differ from country to country. Experience suggests that translating metaphorical terminology into Latvian tends to be a challenge due to the theoretical approach, namely, a conventional understanding of terminology, which fails to account for metaphors in terms. This stems from the linguistic tradition of prescriptivism in Latvia, still lingering on from the 19th century, and the long-standing belief in Latvian linguistics that metaphor is inappropriate in scientific language, including terms. In the traditional view, terms are considered to be non-figurative, monosemous and stylistically neutral

(*Lingvisticheskiy Entsiklopecheskiy Slovar'*, 2002, 508; Rozenbergs, 2004, 184). This prescriptive approach to metaphorical terminology proceeds from the firm belief that scientific style uses emotively neutral words; hence its lexicon is neutral so that terms also function as neutral words. None of this is true today; it is an obsolete belief. However, this approach is common. Actual translation practice shows that many Latvian translators and terminologists have objections to metaphorical terms, which results in demetaphorisation, that is, loss of metaphor in translated terminology. This causes concern and difficulties in translation and interpreting practice.

As metaphor is an indispensable part of scientific theory, cognitive linguists argue that metaphor "cannot be reformulated in literal terms" (Gibbs, 1994, 172), which means that a literal version will fail to convey some quintessential features of the term.

4. *Variants.* Several variants of the same term function simultaneously. Even a seemingly easy translation of the four types of *freedom of movement* (EU) in the Single Market has created confusion in Latvian. These four terms have acquired several translations in Latvian. For instance, *free movement of capital* is translated as 'kapitāla brīva aprite' (*free circulation of capital*) instead of 'kustība' (*movement*) (*Eiropas Savienības terminu vārdnīca*, 2004). Both words are metaphorical. We may wonder what caused this replacement (for more on the translation of the four types of *freedom of movement*, see Naciscione, 2003, 111–112).

5. *Replacement by a definition.* There are a number of reasons why a definition is not an acceptable translation for a metaphorical term. Let me examine the translation of the metaphorical term *money laundering*. Cognitively, this results in a different, non-metaphorical kind of conceptualisation. Semantically, *money laundering* is connected with two other metaphorical terms *dirty money* and *clean money* as they all belong in one semantic field. Furthermore, replacement of the metaphor fails to meet the essential requirement of recognisability, which helps to retrieve the loan from long-term memory by associative links. A definition or an oblique periphrastic description severs associations, and encumbers back translation. The latest Latvian translation of the term is *noziedzīgi iegūto līdzekļu legalizācija* ('legalisation of proceeds of illicit gains').

A definition for a metaphorical term is cumbersome and dysfunctional in practice. A term is functional only if it works both ways: English>Latvian and Latvian>English; it is not a one-way street. If it does not lend itself to derivative and phrase formation, it creates serious syntactic and stylistic problems. Such phrases as *a money launderer, to launder money, an anti-laundering campaign, laundering techniques* and the like present almost insurmountable difficulties for translators and interpreters, especially in simultaneous interpreting. Legal

professionals use the metaphorical loan translation *naudas atmazgāšana* in their daily practice while in official situations they use the approved definition.

The metaphorical loan translation for *money laundering* has been accepted as the official term internationally, including the UN, the OECD and the EU. I would like to offer a few translations of this term in the laws of some European countries for comparison:

FR *blanchiment de capitaux*; DE *Geldwasche*; SE *penningtvätt*; DK *pengevask*; NO *hvitvasking av penger*; ES *lavado del dinero*; PL *pranie pieniędzy*; LT *peningų plovimas*; EE *rahapesu*; HU *pénzmosás*; CZ *praní špinavých peněz*.

It is striking that the others among the ten new EU Member States which acceded to the EU in 2004 have approved a metaphorical loan translation to denote this widespread phenomenon – all, that is, except Latvia.

6. *Use of inverted commas for metaphorical loan terms.* An attempt to avoid metaphor is an interesting feature in translation of Latvian terminology, especially in legal texts. This may perhaps be explained by a sense of uncertainty or doubt whether a metaphorical term will be understood or accepted by readers, or a belief that the metaphor is not quite a proper choice. It is generally believed that inverted commas show that the word or phrase used is "not completely accurate or suitable" (Macmillan, 2002, 757). However, the use of inverted commas also reveals fear that the reader may fail to perceive and understand the figurative meaning. This attitude is reflected in inverted commas, especially frequently used in media discourse. I would argue that use of inverted commas to denote metaphoricity is a case of misguided goodwill.

For instance, the Latvian news portal TVNET published an article with a title that contains the Latvian translation 'toksisks' in inverted commas: *ASV pārdos 142 miljardu dolāru vērtus "toksiskos" aktīvus* ('The US will sell "toxic assets" worth 142 billion dollars'). In the text of the article, the author writes that *ASV Valsts kase pirmdien paziņoja, ka sāks pārdot tā dēvētos toksiskos aktīvus aptuveni 142 miljardu dolāru vērtībā.* ('On Monday the US Treasury announced that they would start selling so-called toxic assets worth 142 billion dollars') (TVNET, 2011). Use of *so-called* (LV 'tā dēvētie' or 'tā saucamie') also occurs in oral discourse.

IATE offers no translation of *toxic asset* into LV; it only gives the definition: *aktīvs, kura vērtība ir samazinājusies* ('an asset whose value has diminished'). According to IATE, this approach is common in Latvian, Spanish, and Portuguese.

7. *Repeated replacement of translation of the term* (common in Latvian). In striving for better translation, new variants are introduced for the same term over the years. For instance, the EU term *a framework directive* has had four successive translations in Latvian since it appeared in the first part of the 90s, when it was translated as 1) *jumta direktīva* ('an umbrella directive'). This term is a

metaphorical replacement, emphasising the encompassing role of the directive. The term was never officially approved. Then other variants followed: 2) '*struktūrdirektīva*' (a structural directive), which started functioning at the end of the 90s; 3) '*ietvardirektīva*', which underscores the framing role of the directive. In 2004 '*ietvardirektīva*' acquired official status as it was included in The European Union Glossary of Terms (*Eiropas Savienības terminu vārdnīca*, 2004). Finally, 4) '*pamatdirektīva*' (a basic directive) is seen as a basis for national legislation. This translation also functions at present. This approach may be seen as a good way to brush up the specialist's memory and their ability to follow the latest changes in translation of terminology.

Translation of the new EU metaphorical terminology into Latvian is a regular challenge. Hundreds of new terms emerge in EU documents every month. Many of them are figurative, and they all need to be translated to acquire legal validity in all 24 EU languages. Eventually they need to be transposed into the national legislation of Member States.

The trend to demetaphorise metaphorical terms is clearly seen if we take a closer look at the Latvian translation of new metaphorical terms used in the EU institutions (the European Commission, the European Parliament). Importantly, loss of metaphor in the official Latvian translation occurs despite the fact that a metaphorical loan translation would not compromise comprehension or euphony, for instance:

EN *a grandfather clause* – LV 'esošo tiesību saglabāšanas klauzula' (a clause to preserve existing rights);

EN *a ceiling price* – LV 'maksimālā cena' (the maximum price);

EN *zero tolerance* – LV 'absolūta neiecietība' (absolute intolerance);

EN *orphan land* – LV 'zeme bez īpašnieka' (land without an owner);

EN *a sunset clause* – LV 'noslēguma klauzula'; 'turpināmība' (closing clause; continuity).

Demetaphorisation also appears in conventional metaphorical terms used in day-to-day work in the European Parliament. The issue becomes more apparent if we compare several languages, e.g. EN *a key vote* – LV 'izšķirošs balsojums' (a decisive vote). Compare: FR *vote clé*; DE *Schüsselabstimmung*. Metaphor is a natural phenomenon in terms as it reflects the quintessence of the thought process; thus, it should not be done away with in translation. In practice, this means that the rule of back translation is violated, no associations are left and the metaphor is lost.

Metaphorical scientific terms may also function in stylistic use in both verbal and visual discourse. This trend is developing along with the increasing use of visualisation in the 21st century as part of visual cross-cultural communication (for illustrations of a visual expression of new metaphorical conceptualisations in *The Financial Times* and *The Daily Telegraph* in advertising and cartoons on topical

political and economic issues, see Naciscione, 2011, 283–286). The functioning of metaphorical scientific terms in discourse is a new pathway for further exploration.

New scientific conceptualisations are frequently presented by creative metaphorical terms that facilitate cognition. I agree that metaphorical terms reveal how imagination shapes language and how language reflects imagination (Gibbs, 1994).

Research in figurative terminology is a fascinating area that discloses the whole gamut of choices: instances of excellent translation, tenacious adherence to the prescriptive principle of non-metaphorical translation of metaphorical terms and examples of misguided goodwill.

Conclusion

A cognitive linguistic approach to use of figurative language is a tool that helps to perceive, understand and interpret metaphor in terminology. A cognitive view of metaphorical terms is also a tool for recognising metaphor as a technique of abstract reasoning and argumentation in both scientific exploration and the formation of new scientific terminology. Translation of metaphor is not merely part of global cross-cultural communication. Translation is a cognitive operation of the mind. It is a cognitive skill that needs to be acquired and developed.

Translation and interpreting practice in Latvia reveals a variety of approaches to translating metaphorical terminology. These create practical consequences.

1. Metaphorical loan translation denotes that the theory is borrowed together with the metaphorical term. This is the best solution as associations serve as a link, facilitating recall.
2. Replacement by another metaphor works in case recall can be achieved by associations of contiguity.
3. Demetaphorisation of a metaphorical term results in a descriptive non-metaphorical conceptualisation. This reveals the traditional approach, namely that metaphor is not accepted in scientific language, which creates serious challenges for translators and interpreters.
4. Creation of variants of the same term that function simultaneously results in confusion and misunderstanding.
5. Replacement of a metaphorical term by its own definiton is unacceptable as it gives a periphrastic description that fails to meet the requirement of recognisability, which encumbers back translation. It is dysfunctional in practice.

6. Use of inverted commas for a metaphorical loan term signifies an attempt to avoid metaphor, which is unsubstantiated as metaphors are an integral part of human thinking.

Translation of metaphorical terms reveals the role of cognitive theory in translation practice of scientific texts.

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