# Metaphor in scientific business journals and business periodicals: an example of the scientific discourse popularisation

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## Abstract

*Studies of metaphor have largely focused on its formal features and meaning in different types of spoken and written texts. This is to the exclusion of a contrastive analysis of metaphor variation in two types of discourse and its implications for the process of the scientific discourse popularisation. An attempt is made in this study to describe metaphor variation at three discourse levels: conceptual, linguistic and communicative in two corpora: one based on scientific business journals and the other, on business periodicals. Results obtained indicate that metaphor variation is a part of the popularisation process and corresponds to its three characteristics: simplification, the use of informal tone and reformulation, besides its employment as a narrative device.*

**Key Words:** *Metaphor, scientific discourse, popularised discourse*

## Introduction

Metaphor has become a highly attractive field of study in the twentieth century, and especially over the past twenty years. The extensive bibliography written on the subject shows two main approaches to the study of metaphor (Ortony, 1993): non-constructivist[2] and constructivist[3], which come from two distinctive doctrines of twentieth-century Western philosophy, positivism and relativism, showing different attitudes towards literal and non-literal language. In the non-constructivist approach, based on the positivist tradition, metaphor is studied exclusively as a phenomenon of language. It is considered to be a trope, an example of non-literal language and is defined in terms of violations of linguistic rules. Metaphors are analysed at sentence level, as individual items, independent of others. The constructivist approach, on the other hand, drawing upon relativism, eliminates the distinction between the literal and non-literal, and views metaphor as instrumental in constructing reality. Metaphors are

argued here to be symptomatic of underlying systems or metaphoric models, and thus, are considered as phenomena of both language and thought. This approach has produced numerous theories[4] concerning metaphor description, processing and production over the last two decades. The common feature of all these contributions is the cognitive view of metaphor, which in many cases is supported by recent developments in psychology and language processing.

The current studies of metaphor within the field of applied linguistics (Cameron and Low, 1999) take a step back from the 'strong' cognitive approach of the 1980s in order to re-establish a language focus in metaphor research. The narrow scope of the cognitive view of metaphor has "led to an unwarranted lack of interest in the *language* of metaphor" (Cameron, 1999: 11). It, then, needs to be studied closer without rejecting its cognitive value. The current studies of metaphor take two directions: on the one hand, there is a strong interest in the methodology of metaphor research, for instance, with an attempt to establish a taxonomy of description levels (Steen, 1999), and on the other, there are examples of applied studies, where metaphor has been analysed with reference to specific contexts, such as spoken discourse (Cameron, 1999), academic discourse (Low, 1999), classroom interaction (Cortazzi and Jin, 1999), or the discourse of chronic illness (Gwyn, 1999).

The studies of scientific discourse popularisation are more limited in number, but they cover various approaches, such as the sociological (Karpf, 1988), the role of mass media (Taylor, 1975; Jones *et al.*, 1978), or the linguistic with special interest in syntax and vocabulary, on the one hand, (Funkhouser y Macoby, 1970; Kahn, 1983; Dubois, 1986; Adams-Smith, 1987a,b; Varantola, 1987), and discourse organisation, on the other, (Nwogu, 1991; Jacobi, 1994).

## The theoretical framework

The description of metaphor change in scientific business journals and business periodicals is based on Lakoff and Johnson's (1980) comprehensive view of metaphor as a phenomenon of thought and language and on Steen's (1999) analytical framework for the account of metaphor features at the conceptual, linguistic and communicative levels.

The metaphor has been defined -in Lakoff's (1993) terms- as a mapping across domains, where each mapping is a set of ontological correspondences between entities in a source domain and those in a target one. In other words, and following Burke's (1945: 503) classical definition, metaphor has been considered as "a device for seeing something in terms of something else". The notions of linguistic and conceptual metaphors have been used to distinguish between text-surface metaphors and the underlying 'metaphorical concepts', which partially build up our conceptual system[5] (Lakoff and Johnson 1980).

In Steen's conceptual level of metaphor description, metaphor is viewed as a proposition, which involves "idea units or thought" (Steen, 1999: 85). The analysis of metaphor involves the use of two traditional notions: Topic and Vehicle[6]. Topic, according to Steen (1999: 85), refers to "the literal entity in the world of the text about which something is predicated in a figurative manner" or, to which a non-literal predicate is attached. This figurative predicate is called the Vehicle. This type of metaphor analysis implies a description of isolated sentence-length metaphors, which may obscure the existence of larger structures or networks, which underlie all types of discourse. This is why Cameron (1999) insists that these types of structure should be described at different levels[7], depending on the corpus available. The level which is of relevance to this study confines the analysis of Vehicle networks to specific discourse communities, where related Vehicles may develop an extended metaphor across several aspects of the Topic. Another element in the conceptual level of analysis -the distinction between 'implicit' and 'explicit' metaphors- also focuses on metaphor as a discourse structuring element. Implicit metaphors are those in which the literal referent crosses the boundary of the sentence[8] and appears in the co-text or context of a given text. Explicit metaphors, on the other hand, are characterised by the inclusion of the literal referent in the sentence. Implicit metaphors require more inferencing between sentences, or between sentence and context, in comparison with explicit metaphors.

The linguistic level of metaphor analysis involves a different analysis of its structure, based on the notions of Focus and Frame[9]. Steen accommodates this concept of metaphor -originally stemming from the idea of metaphor as a sentence- to the discourse view of metaphor. Focus is seen as a semantically odd element in a linguistic expression, while Frame is considered a background against which the Focus stands out. The contrast between Focus and Frame in explicit metaphors is semantic. However, in the case of implicit metaphors it is of pragmatic nature, since the reader must go beyond the sentence to the level of text or even to his own knowledge of the

world to achieve a coherent discourse representation. The linguistic level of analysis allows for the identification of the lexical categories employed to express the Focus.

The communicative level of analysis is based on the view of metaphor as an utterance (spoken or written). According to Steen (1999: 85): "This particular angle on the function of expressions in discourse is essentially communicative; it involves speakers having particular things in mind that they want to talk or write about to other speakers". Metaphor is, then, no longer a proposition, which involves idea units or thought. Here the notions of Topic and Vehicle correspond respectively to the literal entity in the text and to a non-literal Comment made about it. What distinguishes the communicative approach from the conceptual is that not all literal referents in a metaphorical proposition are Topics in a metaphorical utterance[10].

The approach to the popularisation of the scientific discourse adopted in this study draws upon Jacobi's (1994) typology and description of three types of discourse: primary scientific discourse, discourse written for didactic purposes and for non-formal scientific-educational purposes. The transformation from the first to the third type of discourse is considered to be the case of scientific discourse popularisation, which is characterised by five main features: (1) selection of a different focus on content; (2) simplifications and cuttings; (3) use of everyday language and informal tone; (4) inductive text structure; (5) reformulation of specialist terms. Metaphor is considered here as one of the reformulation techniques[11].

## The goals of this study

In view of the current situation in metaphor research and of the main directions in the investigation of discourse popularisation, this study aims to produce the description of metaphor variation in two types of business discourse, scientific and popular, and then to link the distinctive features of this variation to the process of scientific discourse popularisation. The overall objective of this analysis is to suggest in what ways the changes revealed may have been caused by the transformation undergone.

At the conceptual level of metaphor analysis, this study attempts to identify vehicle networks. They may help define the conventional conceptual mappings underlying the scientific and popularised business discourse. In other words, they may allow for an identification of the target conceptual domains brought up to talk about business.

The analysis at the linguistic level aims at identifying the linguistic resources used to produce metaphors. The main interest in this study lies in the classification of the syntactic structures used to produce metaphors, that is, in distinguishing mainly between phrase and sentence metaphors. Any significant variation at the syntactic and lexical level could be considered as symptomatic of the popularisation process taking place. Moreover, this analysis seeks to determine whether the metaphors used in both types of business discourse are nominal or verbal[12]. This question has been raised by a recent criticism made about metaphor literature and its persistence in perpetuating the myth of the nominal linguistic metaphor as the most common or typical (Cameron, 1999).

At the communicative level, the interpretation of metaphors in terms of Topic-Comment relation is thought to contribute to enlightening metaphor textual functions. These, in turn, will help define the purposes for which non-literal Comments are systematically made about a particular Topic. The results of this analysis are subject to certain limitations produced by the researcher's own interpretation of metaphors and the source texts, yet they may shed some light on metaphor communicative features.

## Corpus and methodology

Two corpora have been analysed for this study. The first consists of 90,207 words and is based on twelve articles published in four scientific business journals: *Journal of World Business, Journal of Management Studies, Journal of International Business Studies,* and *Management Accounting Research,* over a two-year period from 1997 to 1998. The second corpus consists of 43,654 words and is based on twenty-nine articles published in 1996 in three widely known business periodicals: *The Economist, Business Week* and *Fortune.* The decision on the sources from which to select metaphors was based on the need to ensure balance and representation of a range of scientific and popularised business writing pieces. All the articles vary in content, discussing different business issues or reporting business news over different periods of time.

We have deliberately allowed for such an evident difference in length between both corpora, since our purpose was to obtain a list of approximately the same number of linguistic metaphors for each type of discourse. As a result, two collections of about

eighty linguistic metaphors were produced: eighty-three in scientific business articles and eighty-one in business periodicals.

The procedure for the selection of metaphors consisted in reading all the articles, searching for linguistic metaphors and identifying them according to Lakoff's definition (1993) mentioned previously. Although reading texts and searching for metaphors allows for human errors, this method has turned out to be the only possible way of collecting the corpus for this study. No technological tool, such as computer software, designed to detect metaphors, has been invented to date.

## Results and discussion

### Conceptual level of metaphor description

The analysis of linguistic metaphors in both corpora has revealed some differences in the conceptual structuring of the two types of discourse. The discourse of scientific journals is grounded in three main conceptual mappings: business as war, business as sport, and business organisation as an individual. The examples that follow show how different elements (metaphorical proposition with a Topic, i.e. literal implicit or explicit referent, and a Vehicle, i.e. non-literal referent) interact in creating a linguistic metaphor. Each linguistic metaphor forms part of a particular conceptual mapping.

### Mapping: Business as war

[1] "Smaller domestic firms, particularly in atomistic industries may effectively be frozen out from this option and can therefore only seek administrative protection as an effective means of counterattack". (*Journal of World Business*, 32: 2 p. 175)
Metaphorical proposition

| Topic (T) and Literal Explicit Referent: (LER): smaller domestic firms in atomistic industries, administrative protection | Vehicle (V): (is) a means of counterattack |

### Mapping: Business as sport

[2] "When administrators or political bodies try to enforce implementation of new management control systems on organizations, various forms of conflicts and games may be observed in the implementation process". (*Management Accounting Research*, 8: 405, 1997)

Metaphorical proposition

    T and Literal Implicit Referent (LIR):        V: (are) games
    actions of the various groups involved
    in the implementation process

## Mapping: Business organization as an individual

[3] "A party's reliance on legal mechanisms may decline as an IJV ages, (...)". (*Journal of International Business Studies*, 29: 1, 1998, p. 182)

Metaphorical proposition

    T and LER: an IJV        V: ages

The discourse of business periodicals is structured through four main mappings: business as war, business as sport, business organization as a machine and as an individual. If the difference in the number and type of conceptual mappings is not significant, the complexity of the target domains involved, point to various sub-mappings, which reveal how metaphors vary from one type of discourse to another.

In the corpus of scientific journals, the mapping of business organization as an individual involves three target domains: individual, religion and journey, thus there are three sub-mappings. The examples below are of religion and journey sub-mappings.

[4] "The guru 'knows the road to the centre of the world: the hole in the sky through which he can fly up to the highest heaven or the aperture through which he can descend to the underworld' (Eliade, 1987, p. 205)" (*Journal of Management Studies*, 35: 2, 1988, p. 140).

Metaphorical proposition 1

    T and LIR: a specialist in management    V: (is) a guru

Metaphorical proposition 2

    T and LIR: achievement of a business success    V: (is) the road to the centre of the world: the hole in the sky through which he can fly up to the highest heaven or the aperture through which he can descend to the underworld

[5] "Here the organization must make a perilous journey (...)" (*Journal of Management Studies*, 35: 2, 1988, p. 155).
Metaphorical proposition
    T and LER: the organization           V: must make a perilous journey

The metaphors in the corpus of business periodicals employ a greater variety of target domains in their sub-mappings. For instance, in the mapping of business as sport, there are references to games and hunting.

[6] "Anyway, as Motorolans are all quick to remind you, they are in this China game for the long haul" (*Fortune*, 27/5/96, p. 42).
Metaphorical proposition
    T, LER: Motorolans           V: (are in this) China game for
                                      the long haul

[7] "Four years later he became CEO of RJR Nabisco Holdings, where he stayed until a desperate IBM lured him away" (*Fortune*, 29/4/96, p. 59).
Metaphorical proposition
    T, LER: he, CEO of RJR Nabisco Holdings,    V: lured him away
    a desperate IBM

The business organization-as-machine mapping includes the sub-mappings of liquid and journey.

[8] "Although Euro Disney is unlikely ever to be the money machine Disney dreamed of, improvements are beginning to come through" (*The Economist*, 13/4/96, p. 79).
Metaphorical proposition
    T, LER: Euro Disney           V: (is) money machine

[9] "He has pumped tens of millions of dollars into agribusiness ventures and R&D in investment-starved Chiapas" (*Business Week*, 11/3/96, p. 23).
Metaphorical proposition
    T, LER: he, tens of millions of dollars,    V: has pumped
    agribusiness ventures and R&D
    in investment-starved Chiapas

[10] "GAZ still faces rocky stretches in the road ahead, from rising costs of raw materials to the drag on productivity from a bloated workforce" (*Business Week*, 27/5/96, p. 18).
Metaphorical proposition

| T and LER: GAZ, rising costs of raw materials, the drag on productivity from a bloated workforce | V: faces rocky stretches in the road ahead |
|---|---|

The mapping of business organization as individual is expanded through domains of marriage, family and food.

[11] "(...), maybe it wasn't such a good idea for the company to swallow EDS and Hughes a decade ago" (*Fortune*, 29/4/96, p.39).
Metaphorical proposition

| T, LER: the company, EDS | V: to swallow |
|---|---|

[12] "This once heavenly match may turn out to be the marriage from hell." (*Business Week*, 11/3/96, p. 19).
Metaphorical proposition

| T, LER: this once heavenly match | V: the marriage from hell |
|---|---|

[13] "Its Venezuelan parent is blasting full-throttle into the U.S." (*Business Week*, 11/3/96, p. 24).
Metaphorical proposition

| T, LIR: Petróleos de Venezuela | V: its Venezuelan parent |
|---|---|

[14] "Can tobacco industry now afford to breathe freely once again, unlike its customers?" (*The Economist*, 1/6/96, p. 70).
Metaphorical proposition

| T, LER: tobacco industry | V: breathe |
|---|---|

As can be seen in the examples given, the metaphors in business periodicals reveal the existence of conceptual mappings with greater variety of target domains.

The analysis of metaphors from the point of view of Topic explicitness or implicitness (location in or outside the sentence) has given the following results: seventy-six per cent of all metaphors are explicit in the corpus of scientific articles, while eighty-six per cent are explicit in business periodicals. In other words, the number of explicit metaphors is slightly higher (by ten per cent) in periodicals than in journals.

In view of these results, it seems that the metaphor variation at the conceptual level is in line with Jacobi's (1994) third characteristic of the popularised scientific discourse, that is, with the use of everyday language and informal tone. Although metaphors are used in both types of discourse, scientific and popularised, the latter represents a higher degree of metaphorical conceptual complexity. The recurring references to as many as ten target domains (see examples [6]-[14]) in different sub-mappings, reveal to what extent metaphor is used in making business issues more familiar to non-specialist readers. The discourse of business periodicals, as compared with scientific business journals, appears to be more deeply embedded in everyday experience, language and tone.

Most of the metaphors used in both corpora contain explicit Topics. The level of conceptual processing, which may depend on metaphor explicitness or implicitness, is therefore low. This may be due to the fact that the two types of discourse are non-literary and thus the metaphorical language is not an aim in itself, but is instrumental in presenting business affairs. A slightly higher percentage of explicit metaphors in business periodicals, though insignificant, could indicate that simplified scientific discourse (Jacobi, 1994) implies an even lower level of conceptual processing. This, however, should be further studied and confirmed.

### Linguistic level of metaphor description

As can be seen in Table 1, the metaphor variation at the linguistic level shows the same syntactic structure in both types of discourse: sentence metaphor is the predominant type of syntactic structure (75% and 80%) as compared with phrase metaphor (25% and 20%). All the examples of the latter type are noun phrases.

Some significant differences between the two types of discourse can be observed in the lexical category of Focus, i.e. a semantically odd element in a linguistic expression. The most important variation between the two corpora consists in a

greater use of verb as the metaphor Focus in business periodicals (50% as compared to 19% in scientific journals). Nouns, on the other hand, are more frequently used as metaphor focus in scientific journals (69% as compared to 47%), and the same applies to adjectives (12% in comparison to 3%).

| SCIENTIFIC BUSINESS JOURNALS | | BUSINESS PERIODICALS | |
|---|---|---|---|
| Metaphor syntactic structure | | | |
| (Noun) Phrase metaphors | 25% | (Noun) Phrase metaphors | 20% |
| Sentence metaphors | 75% | Sentence metaphors | 80% |
| Focus lexical category | | | |
| Verb | 19% | Verb | 50% |
| Noun | 69% | Noun | 47% |
| Adjective: | 12% | Adjective | 3% |

Table 1. Metaphor variation at the linguistic level

In the examples of noun phrase metaphors which follow, Focus lexical categories are listed separately.

[15] " 'pathological' state of industry" (*Journal of Management Studies*, 35: 2, 1988, p. 126). Focus: pathological (Adjective).

[16] "Big Mac empire" (*Journal of World Business*, 32: 2, 1988, p. 191). Focus: empire (Noun)

[17] "IJV behavior" (*Journal of International Business Studies*, 29: 1, p. 180). Focus: behavior (Noun)

[18] "the cost disease" (*Management Accounting Research*, 8, 1997, p. 407). Focus: disease (Noun).

[19] "corporate parent" (*Fortune*, 29/4/96, p. 39). Focus: parent (Noun)

[20] "financial drains" (*Business Week*, 4/3/96, p. 35). Focus: financial (Adjective)

[21] "marathon between the banks" (*The Economist*, 13/4/96, p. 79). Focus: marathon (Noun)

Similarly, Focus has been singled out in the following examples of sentence metaphors.

[22] "A party's reliance on legal mechanisms may decline as an IJV (International Joint Venture) ages, (...)" (*Journal of International Business Studies*, 29: 1, 1998, p. 182). Focus: ages (Verb).

[23] "Most of the corporations who have suffered a major (or even a minor) communications disaster in the past couple of decades share a single malady" (*Journal of World Business*, 32: 2, p. 195). Focus 1: suffered (Verb), Focus 2: malady (Noun)

[24] "(...) Monks and Minows emphasize that these shareholdings by incumbent managers (...) and other employees may be used as 'poison pills' to defend entrenched managers (...) from shareholder exit (...)" (*Journal of Management Studies*, 35:1, 1998, p. 84). Focus: poison pills (Noun phrase)

[25] "Potential customers are bombarded with special offers during the quiet winter months" (*The Economist*, 13/4/96, p. 79). Focus: are bombarded (Verb)

[26] "The British auto industry whirs with reports that Kim may soon take over Lotus, best known for its hot sports cars" (*Fortune*, 13/5/96, p. 66). Focus: whirs (Verb)

[27] "Germany's rebound would be 'the locomotive for an export-led revival' on the Continent, (...)". (*Business Week*, 27/5/96, p. 15). Focus: locomotive (Noun)

In view of the results obtained, it is difficult to draw definite conclusions about the variation of metaphor syntactic structure in the two corpora. It is evident that in both cases the main tendency is to use sentence metaphors rather than phrase metaphors. However, the differences between the percentages shown in Table 1 are not significant enough to conclude which type of metaphor syntactic structure is preferred in business scientific journals and which in their popularised version.

As far as Focus lexical category is concerned, it appears that in the corpus of scientific discourse there is a clear tendency to employ nominal metaphors, whereas in periodicals both nominal and verbal metaphors are used nearly as frequently. These results support Cameron's (1999) claim to a certain extent: only half of the metaphors used in the popularised business discourse are of verbal type. The scientific business discourse, on the other hand, is structured through the nominal metaphors.

The frequent use of nominal metaphors in business journals could point to the importance paid in the scientific discourse to the factual information and specialist

terminology (see examples [16]-[18], [23] and [24]). If, then, the popularisation of scientific discourse consists in its simplification and metaphor is one of its reformulation techniques (Jacobi 1994), verbal metaphors in business periodicals could serve to carry out this transformation. Verbs describe states and actions, and it is in this sense that they can be considered as narrative devices. Metaphorical verbs may be responsible for narrating what has been stated in the scientific discourse.

Finally, other metaphor variation consists in a more frequent use of adjective as metaphor focus in scientific journals than in periodicals. Surprisingly enough, it is in the latter case where metaphorical adjectives could be expected to fulfil the function of narrative adornment enriching business narration. Nevertheless, if this variation is considered in terms of scientific discourse simplification, the lower number of metaphorical adjectives in periodicals might point to the existence of this particular aspect of popularisation process.

### Communicative level of metaphor description

This level of analysis concentrates on the relation between Topic (Literal referent) and non-literal Comment made about it. As shown in the example below, Topic in a metaphorical proposition becomes the Topic of the metaphorical uterrance, and Vehicle changes into Comment.

[5] "Here the organization must make a perilous journey (...)" (Journal of Management Studies, 35: 2, 1988, p. 155).
Metaphorical proposition
    T and LER: the organization             V: make a perilous journey
Metaphorical utterance
    T: the organization                   Comment (C): make a perilous journey

In some cases literal referents in a metaphorical proposition, expressed by a particular text-surface metaphor, are reduced in number when the related metaphorical utterance is considered. This happens when there are more than one literal referent in a linguistic metaphor. Examples below, which have previously been commented on, refer to this particular case of Topic scope reduction. It can

be observed how the focus on the literal elements at the conceptual level of analysis changes when it comes to interpret a metaphor at the communicative level.

[1] "Smaller domestic firms, particularly in atomistic industries may effectively be frozen out from this option and can therefore only seek administrative protection as an effective means of counterattack". (Journal of World Business, 32: 2, p. 175)
Metaphorical proposition

| | |
|---|---|
| Topic (T) and Literal Explicit Referent: (LeR): smaller domestic firms in atomistic industries, administrative protection | Vehicle (V): (is) a means of counterattack |

Metaphorical utterance

| | |
|---|---|
| Topic (T): administrative protection | Comment (C): is a means of counterattack |

[7] "Four years later he became CEO of RJR Nabisco Holdings, where he stayed until a desperate IBM lured him away" (Fortune, 29/4/96, p. 59).
Metaphorical proposition

| | |
|---|---|
| T: he, CEO of RJR Nabisco Holdings, a desperate IBM | V: lured him away |

Metaphorical utterance

| | |
|---|---|
| T: he | C: was lured away by IBM |

Communicative level of analysis at this stage overlaps with the conceptual. Different Topics make up larger concepts, such as business as human activity. Comments on the other hand, combine into notions of war, sport, individual or machine, which focus on different aspects of business.

Another stage in this analysis consists in elucidating the purposes for which metaphors have been used. Our interpretation of the metaphors in scientific business journals has allowed for the distinction of three metaphor communicative functions. In our view they offer new insight to business, may be used as a research instrument (e.g. game theory), and also offer compact form for business terms (e.g. 'dumping injury', 'soft credit', 'hard credit', 'budget games', etc.). These functions can be easily linked -although not in a one-to-one manner- to the three metaphor qualities mentioned by Ortony (1975: 45): "vividness", "compactness", and the "ability to convey the inexpressible".

As far as business periodicals are concerned, we suggest that metaphor functions differ only with respect to one specific discourse communicative purpose. Metaphor is not used as a research instrument of a significant cognitive and epistemological value. Instead, its presence in the text is typically rhetorical as it fulfils the function of narrative device.

This particular metaphor variation, which is linked to discourse communicative functions, is determined by the type of the intended audience, which the two types of discourse are aimed at. Scientific journals are written for specialist readers, whereas periodicals are intended for the general public. Therefore, even new insight into business -the common function of both text types- varies slightly. In journals, metaphors contribute new knowledge to the field of study, while in periodicals, they provide a simpler and more familiar view of current business events.

Finally, what clearly differences both types of discourse is the author's attitude towards the metaphorical expression. The use of inverted commas for some linguistic metaphors in scientific business journals (see examples [15] and [24]), points to an intention to clearly separate the literal from the non-literal, and in this way to keep a distance from what is non-literal, metaphorical or simply non-scientific. The absence of inverted commas in business periodicals, on the other hand, could indicate the lack of this type of distance.

These two elements of metaphor variation, the move from the scientific-instrumental to the text-level narrative function of metaphor, on the one hand, and from the author's distance to the identification with metaphorical use of words, show that there is a certain type of communicative transformation taking place that adds to the process of popularisation of scientific discourse.

## Conclusions

We should conclude by saying that the popularisation of the scientific business discourse at the level of metaphor variation consists in a number of transformations. At the conceptual level, target domains involved become greater in number and type, increasing the references to everyday experience. Metaphor explicitness rises slightly

too, contributing to a lower level of inferencing in metaphor processing. At the linguistic level, there is a tendency to employ considerably more verbal metaphors to the detriment of nominal metaphors. Adjectives as metaphor Focus are used less frequently. At the communicative level, there is a shift in the type of metaphor functions: from the scientific-instrumental to rhetorical-narrative. Finally, the author's attitude alters from an intended distance towards the metaphorical use of language to an identification with this type of linguistic expression.

The transformations undergone point to certain features of the popularised scientific discourse: simplification, reformulation and the use of everyday language and tone. All the transformations listed previously can be understood as types of simplification taking place at different discourse levels: especially metaphor processing and the type of metaphor used. In the latter case, it is the verbal metaphor which acquires the status of a narrative device, and the popularised discourse becomes a narration. Reformulation, that is the use of analogies, refers specifically to a greater variety of conceptual mappings and sub-mappings, which make the comprehension of business content more straightforward. Target domains involved in establishing analogies are based on everyday experience, language and tone, and this is another feature of the popularisation process. Finally, the author's attitude towards the use of metaphorical language should be added to Jacobi's (1994) taxonomy of popularised discourse features.

This study is by no means a complete one and, for instance, a more detailed analysis of metaphor syntactic structure along with metaphor frequency survey should be completed too. One suggestion for further research is to continue with this line of contrastive analysis, which can be applied to other types of corpora based on scientific and popularised discourses. Thus, a more comprehensive view of the popularisation process could be gained.

1 Two books collecting the bibliography on metaphor have been published to date: Shibles's (1971) including over three thousand titles, and Van Noppen & Hols's (1990) with more than three thousand and five hundred references stated.

2 The non-constructivist view on metaphor is represented mainly by the works of Richards (1936), Black (1962), Reddy (1969), Matthews (1971), Kintsch (1974), and Ortony (1975, 1979, 1980). For bibliographical references see Ortony (1993).

3 The constructivist approach to metaphor can be found in Rumelhart (1979, 1993), Reddy (1979, 1993), Lakoff and Johnson (1980), Lakoff (1993), Sternberg, Tourangeau and Nigro (1993). For bibliographical references see Ortony (1993).

4 See, for example, Mac Comarc (1985), Kittay (1987), Lakoff (1987a,b), Turner (1987), Johnson (1988), Steen (1994), Gibbs (1994).

5 The notion of 'our conceptual system' is taken from Lakoff and Johnson (1980: 3) who argue that it is made up of concepts which "structure what we perceive, how we get around in the world, and how we relate to other people". They follow on by saying that "our conceptual system thus plays a central role in defining our everyday realities".

6 Richards (1936), who first used these terms, defined them in the following way: Topic (occasionally called Tenor) is the subject of the metaphor, whereas Vehicle is the image which embodies Topic. The relationship between the two terms is that of similarity and 'tension'. This last feature is what guarantees the success of a metaphor: the incompatibility between Topic and Vehicle becomes apparent during the interpretation process.

7 Cameron (1999) distinguishes between three levels of Vehicle systematicity: local (within a particular text), global (across texts from a range of discourse types and content), and discourse (within language use in specific discourse communities).

8 Although Steen (1999) uses the terms 'clause' and 'sentence' interchangeably in referring to a sequence of words regarded as capable of standing alone to express a coherent thought, we prefer using the term 'sentence'. 'Clause' may be associated with smaller units of sentences, for example, with main clauses or subordinate clauses.

9 Black (1962) first used these two concepts. In his example "The chairman ploughed through the discussion", the word "ploughed" is the focus of the metaphor, and the remainder of the sentence in which that word occurs is the frame. The bearer of the metaphorical meaning is no longer the word but the sentence as a whole. The interaction process does not merely consist in substituting one word for another, or one name for another, but in an interaction between a logical subject and a predicate. Therefore, if metaphor consists in some deviance, it concerns the predicative structure itself.

10 Steen (1999: 85-6) offers one example: "The river betrayed its proximity", where "river" and "proximity" are two literal referents, about which something is predicated in a non-literal manner, that there is a relation of betrayal between them. In the communicative view, only "river" is the Topic about which a Comment is made, that it "betrays its proximity".

11 The reformulation techniques listed by Jacobi are divided into three large groups: 1) expansion and paraphrase; 2) substitution and anaphora; 3) metaphorical axis (a comparison or an analogy allows for an approximation to the 'pivot' term of the common language). Moreover, Jacobi distinguishes three main reformulation mechanisms: 1) designation; 2) definition; and 3) analogy (comparisons and metaphors).

12 Nominal metaphor is understood as a metaphor whose Focus is expressed by a noun or a noun phrase. In verbal metaphor, on the other hand, the Focus is expressed by a verb or a verb phrase

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