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Readership and Purpose in the Choice of Economics Metaphors

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The findings described in this article suggest that writers' choices of linguistic metaphors are importantly influenced by 2 factors: the text's intended readership and its purpose. We describe a corpus comparison of metaphor use in scientific and popular business discourse. Frequency measures and concordancing techniques were used to identify the differences in metaphorical use between the 2 corpora. A narrower range of metaphors was found in the scientific business corpus than in the popular business corpus. Functions of the genre-specific metaphors in each corpus were then examined using a framework based on work by Henderson (1986), Lindstromberg (1991), and Goatly (1997). Despite their having related subject matter, the 2 corpora shared relatively few linguistic metaphors, and metaphors appeared to be used for a different range of functions in each corpus.

Within the cognitive tradition, much analysis of metaphor in use has considered its informational and heuristic properties. Researchers have been concerned to identify the metaphors that express certain concepts in the target domain, and have used their findings to reflect back on the conceptual structures of the mind. For instance, Kövecses researched in detail the metaphors that express different notions of happiness (1991), friendship (1995), and emotion (2000) through data generated by informants and through corpus data.

In terms of the functions of metaphor, the main focus of early metaphor research was on its role in the development and communication of knowledge. Black

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(1962) argued that metaphor is a tool in the prescientific stages of a discipline, and has a heuristic role in developed sciences. It has been shown that metaphor contributes centrally to the formulation of new theories and in the extension of the old ones (for example, Bicchieri, 1989; Boyd, 1993; Knudsen, 1999; Pylyshin, 1993).

In the 2000s, there has been a growing call for the reconsideration of social aspects of metaphor use. Koller (2004) pointed out that in Lakoff and Johnson's (1980) early work, the capacity of metaphor to hide and highlight was discussed, but its ideological significance had not been fully explored, and has since been sidelined by some researchers in the cognitive school. Her work showed that the persuasive message of the text is also an important factor in the choice of linguistic metaphors. Charteris-Black (2004) considered this ideological function, across a range of genres. Cameron and Low (2004) considered issues of genre and readership in a comparative study of metaphor use in different text types. The differences in metaphor use that they found were attributed to three parameters, relating to the differences in text users, to the estimated cognitive challenge of the subject matter, and to conventional text form. In spoken discourse, Cameron (2003) has shown that linguistic metaphors are developed and negotiated by participants. In extensive cross-linguistic studies, Kövecses (2005) has argued for the consideration of cultural influences on metaphor use.

This article contributes to this growing body of research into social and cultural issues concerning metaphor use. The findings described here suggest that intended readership and the primary purpose of the text are important factors in the choice of linguistic metaphor. Differences between these two factors may lead to different patterns, frequencies, and functions of linguistic metaphor in texts even where the topics of the texts are similar.

METAPHOR AND ECONOMICS TEXTS

In his discussion of research into the metaphors of economics, Henderson (2000) critiqued the use of popular texts such as *The Economist* in English language teaching for students of economics, arguing: "The language in *The Economist* shares … a family resemblance with the language of formal economics. But it is not clear how close that family resemblance is" (p. 170). This article describes a research project that looked at an aspect of this question. We compared the metaphors used in scientific business and economics discourse with those used in popular business discourse, as typified in *The Economist* and similar publications. We found that the family resemblance between metaphorical language in the two text types is not especially close, and we examined the functions of the metaphors we found in a search for explanations for this.

The term *scientific business discourse* refers here to texts that report research in the field of business sciences and that are written by and intended for researchers.

Popular business discourse refers to journalistic texts that deal with current economic and business matters for an audience of experts and nonexperts, and seek to inform and entertain more generally. Popular business texts are not usually a rewriting or transformation of scientific business texts.

Metaphor is a key methodological instrument in economics research. Economic scientists cannot control the necessary variables in the real world, and therefore have to test their hypotheses in an ideal world. Metaphor is used to handle the transition from one setting to the other (Hewings, 1990). Indeed, "each step in economic reasoning, even in the reasoning of the official rhetoric, is metaphoric," in McCloskey's (1986, p. 75) view.

As is the case for metaphor research generally, much research into popular economic and business discourse has been concerned with identifying the conceptual metaphors used in the genre, and has started from the linguistic analysis of texts, often, like this study, using corpus linguistic methodology. Several studies have researched the function of metaphor in popular economic and business discourse. A key issue has been the ideological use of metaphor, and by implication the ideologically-based choice of particular metaphors (Boers & Demecheleer, 1997; Charteris-Black, 2004; Dunford & Palmer, 1996; Eubanks, 1999; Koller, 2004).

Research has tended to focus on either scientific or popular texts. There have been relatively few studies that compare the two types of discourse. The study described here aims to identify differences in metaphor use between scientific business discourse, as represented by a corpus of research articles, and popular business discourse, as represented by a corpus of periodical articles. The study seeks first to identify some of the most frequently used metaphors in each type of discourse, and then to explore the functions of these metaphors. Findings for each corpus are compared and discussed.

METAPHOR TYPES AND TOKENS IN THE CORPORA

Corpora and Methodology

Two corpora were compiled for this study. The first corpus contains 403,288 words and consists of business research articles (henceforth referred to as the Research corpus) taken from three journals: *Journal of Economics & Management Strategy, Management Science,* and *Strategic Management Journal*. The second corpus contains 404,251 words and is made up of articles from three business periodicals (henceforth referred to as the Periodicals corpus): *Business Week, The Economist,* and *Fortune*. Both corpora contain texts published between 1997 and 2003.

Using a methodology similar to that described by Charteris-Black (2004), two samples were first selected from the main corpora to search for metaphors by hand,

Charteris-Black's *metaphor keys*. Each sample corpus consists of approximately 30,000 words. The Research sample consists of three research articles, each taken from a different journal; the Periodicals sample is made up of 13 articles, several from each of the periodicals in the corpus. Research articles are typically much longer than periodicals ones. The articles were as follows:

Sample Research Corpus

"The Regulation of Predatory Firms" (Faure-Grimaud, A. *Journal of Economics and Management Strategy, 6*[4], 1997, 849–876.)

"The Free Cash Flow Hypothesis for Sales Growth in Firm Performance" (Brush, T., Bromiley, P., & Hendrickx, M. *Strategic Management Journal*, *21*[4], 2000, 455–472.)

"Technology Regimes and New Firm Formation" (Shane, S. *Management Science, 47*[9], 2001, 1173–1190.)

Sample Periodicals Corpus

"The Euro: Special Report" (Peterson, T. *Business Week*, April 27, 1998, 101.)

"Web Ads Start to Click" (Himelstein, L., Neuborn, E., & Eng, P. *Business Week*, October 6, 1997, 128–138.)

"World Trade: Two Steps Forward, One Step Back" (Pennar, K. *Business Week*, August 31, 1998, 116–119.)

"Hello Internet" (Elstrom, P. *Business Week*, May 3, 1999, 128–132.)

"The Tech Slump" (Hof, R. D. *Business Week*, December 18, 2000, 54–58.)

"In Search of the Perfect Market" (Anderson, C. *The Economist*, May 8, 1997, 3–5.)

"Investors Unite" (Barry, B. *The Economist*, October 25, 1997, 3–6.)

"Capitals of Capital: A Survey of Financial Centres" (Edwards, B. *The Economist*, May 7, 1998, 8.)

"Chairmen and Bosses" (Anonymous. *The Economist*, March 16, 2000, 21.)

"Banks and Business" (Anonymous. *The Economist*, November 23, 2000, 19.)

"The Unfinished Recession" (Woodall, P. *The Economist*, September 26, 2002, 3–27.)

"Globalization" (Useem, J. *Fortune*, December 16, 2001, 76–82.)

"Can this Bull Run Again?" (Schwartz, N. D., & Kahn, J. *Fortune*, December 30, 2002, 68–77.)

As indicated in their titles, the articles in the sample Research corpus are detailed discussions of factors affecting the behavior of firms, and their growth, development, and performance. Articles in the sample Periodicals corpus essentially con-

TABLE 1
Examples of Goatly's Metaphor Types

Goatly's Term	*Goatly's Examples*	*Example From Our Corpora*
Active	icicles (hanging rod-like formation)	stag hunt (takeover); fire sale (sale at very low prices due to a crisis)
Tired	squeeze: financial borrowing restriction	safety valve (mechanism for averting crisis); pocket (make a profit)
Sleeping	crane: machine for pulling weights	moribund (functioning very poorly, on the point of failure); fringes (extreme points of an organisation)
Dead	red herring: irrelevant matter	cure (solution)
Dead and Buried	inculcate: indoctrinate	not identified in data

sider similar and related topics. Issues such as technology, pricing, competition, market, and regulation recur in both corpora, and metaphorical notions such as growth and cash flow are common to both. However, the different readerships are evident in the different approaches taken; the Periodicals corpus tackles its topics more narrowly and broadly than the Research corpus, often taking anecdotes from a single company, or from an individual's behavior or experience, and then discussing them in a national or global context. It also has a strong current affairs focus, often directly tackling contemporary news stories or linking these to business issues.

The sample corpora were examined in detail to find all examples of linguistic metaphor. The identification of metaphor is notoriously subjective, and for this study a fairly broad understanding was used. This included words whose metaphorical meaning is well established in the language, Goatly's (1997) Inactive metaphors, as well as innovative ones, Goatly's Active metaphors. However, we excluded metaphors that are completely historical, Goatly's Dead, and Dead and Buried metaphors. Dead and Buried metaphors are "hidden by formal changes" (Goatly, 1997, p. 33), and we did not search for these in the data. Examples of each type are given in Table 1.

A general dictionary was used to assist in the identification and classification process, *Macmillan English Dictionary for Advanced Learners* (Rundell & Fox, 2002; henceforth referred to as the general dictionary). The Pragglejaz Project (Steen, 2005) on metaphor identification argued that it is a suitable dictionary for this purpose, because it is based on a large corpus of contemporary English from a range of sources. For Dead metaphors, the dictionary may include two meanings of a word that have a potentially metaphorical relationship, but it will be clear from the definitions that there is little or no semantic connection between them for current speakers. For example, the verb *cure* has four senses in the general dictionary, as follows:

1. to stop someone from being affected by an illness …
2. to control or get rid of a bad habit, feeling or attitude …

3. to solve a problem …
4. to preserve meat, fish or other foods by drying them, or by using smoke or salt … (p. 340)

The definitions help the analyst to identify the first three senses as metaphorically related, and to see the fourth as unrelated. However, an etymological dictionary (Little, Fowler, Coulson, & Onions, 1973) indicates that all four senses are historically related, deriving from a general sense of *care*. Because there is no apparent semantic relation between the "preserve meat" sense and the other three senses in modern use, the "preserve meat" sense of *cure* is seen as a Dead metaphor.

The Vehicle terms identified in the sample corpora were searched for in the main corpora using *WordSmith Tools*, Version 4 (Scott, 2004), a concordancing program. All the Vehicles identified in both sample corpora were searched for in both main corpora. That is, Vehicles from the Research sample corpus were searched for in the Research main corpus, and also in the Periodicals main corpus, and vice versa. When a Vehicle term was found in either of the main corpora, context was examined to establish whether its use in that context was metaphorical, and if so, to determine its meaning and function. It should be noted that this method can only find in the main corpus those metaphors that have been previously identified by hand in the sample corpus. A complete search for metaphors in the main corpora was not carried out, so results cannot be taken to indicate the frequency of all metaphors in the main corpora.

Results

The examination of the sample Research corpora resulted in the identification of 23 Vehicle terms (the figure "23" represents types, not tokens). We classified them into six source domains, by identifying the basic meaning of the Vehicle term and grouping those that appeared to be related semantically. This process is inevitably dependant on our intuitions, which we supported with specialist and general dictionaries. Two Vehicle terms did not seem to be related semantically to any others, so in terms of the sample corpora could be described as one-shot mappings. However, given the limited amount of data studied, it would be unsafe to assume that they are not part of a wider mapping. Table 2 gives the source domains and Vehicles.

Seventy-two Vehicle terms were found in the sample Periodicals corpus. These were classified into 11 source domains. Although there was only one Vehicle from the source domain of hunting in the Periodicals sample, its existence and exploitation in the Research sample indicates that it is a well exploited domain in business discourse generally. All other Vehicle terms found in the sample Periodicals corpus were related semantically to two or more other Vehicle terms. Table 3 gives the source domains and Vehicles.

TABLE 2
Vehicle Terms in the Sample Research Corpus

Source Domain	*Vehicle Terms*
Human life (6)	age, grow, growth, infant, life cycle, mature
Mechanics (2)	flow, leverage
Journey (2)	free ride, free rider
Games (2)	game, mover
Hunting (7)	hunt, hunter, predation, predatory, prey, rabbit, stag
Clothing (2)	cap, pocket
Others (2)	basket, story

TABLE 3
Vehicle Terms Identified in the Sample Periodicals Corpus

Source Domain	*Vehicle Terms*
War (15)	army, battle, battlefield, beleaguered, bloodbath, bomb, casualty, fire, kill, killer, retreat, siege, tank, war, weapon
Animal/ human life (11)	animal, bear, bull, fish, grow, growth, hatch, hawk, mammoth, minnow, tame
Plant life (5)	blossom, bull, prune, ripe, wither
Mechanics (12)	accelerator, bottle up, brake, engine, flow, fuel, machine, pump, roller, safety valve, sputter, trickle
Illnesses/remedies (6)	elixir, hangover, hurt, indigestion, malaise, moribund
Eating/drinking (5)	binge, drunk, eat, gobble up, scoop up
Journey (6)	bump, derail, race, road, station, train
Nautical (5)	shipwreck, shoal, splash, steer, tide
Games (3)	game, player, playing field
Hunting (1)	lure
Building (3)	architecture, buttress, erode

It is clear that the number of Vehicle types identified and the number of source domains drawn on are higher in the sample Periodicals corpus than in the sample Research corpus. Where the same source domains appear to be used in the two corpora, the linguistic realizations are often different.

We then searched the main corpora for the Vehicle terms that had been identified in the sample corpora. Results of the search are given in Column 3 of Table 4, in terms of tokens, not types. Column 4 gives the token/type ratio for each corpus. In other words, the average number of times each metaphor Vehicle occurred in the corpus. For example, 982 tokens or instances of the 23 metaphor Vehicles searched for were found in the main Research corpus, meaning that each of the 23 Vehicles was used on average 42.7 times.

TABLE 4
Numbers of Vehicle Types and Tokens Found in Main Corpora

Corpus	*Number of Vehicle Types Searched For*	*Number of Vehicle Tokens Found*	*Token/Type Ratio of Metaphor Vehicles*
Research	23	982	42.7
Periodicals	72	1627	22.59

As noted earlier, this does not represent the total number of metaphors in each of the main corpora, because only those Vehicle terms already identified in the sample were searched for. However, as can be seen from Tables 2 and 3, the Vehicles searched for include many that are well documented in the metaphor literature, so we feel justified in claiming that these ratios may be representative of the more frequent metaphors in the main corpora more generally.

Tables 2 and 3 show that almost three times as many Vehicle types were identified in the sample Periodicals corpus as in the sample Research corpus. Table 4 shows that the number of tokens found in the main Periodicals corpus is also a good deal higher than the number of tokens found in the main Research corpus. However, the difference between numbers of tokens is not as marked as the difference in numbers of types. This is explained by the ratio of tokens to types, given in Column 3 of Table 4. Each Vehicle type found in the sample Research corpus appears on average 42.7 times in the main Research corpus, a ratio that is nearly twice as high as the comparable ratio for the Periodicals corpus. In other words, these searches suggest that although popular business discourse makes use of a wider range of Vehicle types than scientific business discourse, the difference in overall metaphorical use is slightly less marked, because scientific business discourse tends to reuse the same Vehicle terms more frequently.

We then looked at the overlap between metaphor use in the two main corpora, by searching each of the main corpora for all the metaphor Vehicles found in both sample corpora. Table 5 presents results. As previously shown, 23 Vehicle types

TABLE 5
Overlap of Metaphor Tokens Between Main Research and Periodicals Corpora

Corpus	*Vehicle Tokens From Sample Research Corpus Found*[a]	*Vehicle Tokens From Sample Periodicals Corpus Found*[b]	*Total Vehicle Tokens*
Research	982	65	1047
Periodicals	126	1627	1753

[a]23 types searched for.
[b]72 types searched for.

were found in the sample Research corpus. Although 982 instances of these had been found in the main Research corpus, only 126 instances of the same Vehicles were found in the main Periodicals corpus. In the sample Periodicals corpus, 72 Vehicle types were found. There were 1,627 instances of these found in the main Periodicals corpus, but only 65 instances of the same Vehicles were found in the main Research corpus. In other words, although there is a large number of metaphor tokens in each of the two main corpora for the Vehicle types searched for, only a small proportion is shared with the other corpus. Some disparity would be expected, but these figures suggest that there is relatively little overlap in the linguistic metaphors used in the two corpora.

This second set of searches gave us totals of 1,047 metaphor tokens in the Research corpus, and 1,753 metaphor tokens in the Periodicals corpus (of the types searched for). The metaphors were then analyzed functionally, as described in the following section.

FUNCTIONS OF METAPHORS IN THE CORPORA

Methodology

Henderson (1986) wrote that there are three main uses of metaphor in economics texts:

1. those that serve as a textual decoration or illustration "but not being allocated any central purpose;"
2. metaphors that occur in all language "as a central organising device;" and,
3. metaphor that is "a device for exploring specific economic problems and a basis for extending the domain of economic ideas" (p. 110–11).

Lindstromberg (1991) argued that these three types correspond to the functions identified by Lakoff and Turner (1989), the first group corresponding to their image metaphors, the second to their generic-level metaphors, and the third to their specific-level metaphors. This overall typology was used as the basis for classifying the metaphors found in the corpora. We termed the first category *illustrating*, the second *generic*, and the third modelling.

We began by identifying the generic metaphors, that is, the second of Henderson (1986) and Lindstromberg's (1991) categories, to exclude them from the analysis of genre specific metaphors. Innovative metaphors were not regarded as generic, on the grounds that they are not part of the conventional stock of the language. This first stage was the most straightforward. We used the general dictionary in conjunction with two specialist dictionaries: Collin's *Dictionary of Business* (2001) and *Collins Dictionary of Economics* (Pass, 2001; henceforth re-

ferred to as "the specialist dictionaries"). Where a metaphorical use was not covered in the specialist dictionaries but was found in the general dictionary, we considered it to be a generic metaphor. Where a metaphor was defined in the specialist dictionaries but not in the general dictionary, or where a note indicating that its use is genre-specific was given in the general dictionary, we did not consider it to be a generic metaphor. This gave us useful guidelines for most cases, but in a small number we had to draw on the experience of one of the writers as a teacher of English to students of Business Administration, and consult informants and specialists in the field. Two metaphors identified as generic through this process are the uses of *pocket* and *fueled* in the following citations.

1. In exchange, Zurich was granted the right to the first $225 million from a sale, leaving Ritt and his team to *pocket* 60% of anything left over (Bear, 2003: 138).
2. These evolutionary paths depend on existing scientific knowledge and are *fueled* by a quest for improving a given technology's performance (Zahra & Nielsen, 2002: 379).

In terms of function, Henderson's (1986) description of these generic metaphors as a "central organising device" (p. 110) is very general and could cover a number of more specific functions, such as those listed by Goatly (1997). For this project, we did not subject these generic metaphors to a more detailed functional analysis, and our functional analysis only covers metaphors specific to economics and business texts.

Having excluded generic metaphors, we then analyzed the remaining metaphors in detail to decide which had a primarily decorative or illustrative purpose, and thus belong in the first category, and which are used to explore and extend economic thought, and thus belong in the third category. The analysis was conducted by hand, and involved a detailed examination of cotext for each citation. A specialist informant helped with difficult cases. Examples of metaphors used for illustrating are *road signs* and *eating* [your seed corn] in the following citations:

3. No company knows the power of banner ads better than Toyota. The auto maker slaps these *road signs* all over the Net (Himelstein, Neuborn, & Eng, 1997: 133).
4. In the short run, that's the right thing to do, but it's the equivalent of *eating* your seed corn: It reduces the number of people working on the basic research needed for years hence (Mandel, 1998: 81).

An example of modeling is *game* in the following citation:

5. First, we describe a four-stage *game*. At the first stage firms choose H high or L low quality. At the second, firms either propose a retailing contract to

> the intermediary, or choose to sell directly. At the third, the intermediary accepts, or refuses any sales contract offers. At the fourth, firms decide whether or not to certify quality (Arella & Peitz, 2000: 4).

Models are central to economics research, in mediating between theory and data (Dow, 2002; Morgan & Morrison, 1999), and we therefore expected to find that the third category of metaphors would be represented more strongly in the Research corpus than in the Periodicals corpus.

During the functional classification of the genre-specific citations, we also considered whether there are other functions not covered by the categories of illustrating and modeling, and found that a further function emerged. This seemed similar to one noted in Goatly's (1997) work, and described by him as "filling lexical gaps" (p. 149). Metaphors in this group seemed to have developed originally because the language lacked a way of talking about a particular entity, quality, or action. The term *function* applies in a slightly different sense from the other two categories here, in that the label reflects what the metaphor does for the language, rather than what the writer does with the metaphor. In this category the writer generally uses the metaphor simply to refer, in contrast to the more interactive purposes of illustrating and modeling metaphors. We chose to label this group *filling terminological gaps* rather than lexical gaps, because the function of the genre-specific metaphor was to supply a term needed by the discipline rather than by the language as a whole. Dictionaries were used to identify this group. It was considered that all the metaphors that did not have an alternative term listed by any of the specialist dictionaries had a primary function of filling a terminological gap. For instance, specialist dictionaries define the term *cash flow* but do not offer a synonym. This was taken as evidence that there is no other conventional way of expressing this notion in regular use, and the metaphor *[cash] flow* had therefore filled a terminological gap in citations such as:

6. Indeed, for such firms, increases in *cash flow* result in negative sales growth (Brush, Bromiley, & Hendrickx, 2000: 455).

Generic Metaphors

Of the total metaphors used in each corpus, 1,051 of the Periodicals corpus were generic, that is, nearly 60% of the corpus. The proportion was lower for the Research corpus; we found 355 tokens, representing 34% of all metaphorical uses in the corpus. The same Vehicle term occasionally has more than one sense, one of which was generic and another genre-specific, and in these cases, each instance or token was analyzed and included in the appropriate category. Table 6 gives numbers and percentages of generic and genre-specific metaphors. It is interesting to note that, although the overall number of metaphor tokens in the Periodicals cor-

TABLE 6
Numbers and Percentages of Generic and Genre-Specific Metaphors in the Research and Periodicals Corpora

Corpus	Total Metaphor Tokens	Generic Metaphor Tokens		Genre Specific Metaphor Tokens	
		Number	%	Number	%
Research	1047	355	34	692	66
Periodicals	1753	1051	60	702	40

pus is a good deal higher that in the Research corpus, the numbers of genre-specific metaphors are very close. It was shown earlier that the Research corpus tends to reuse a smaller number of metaphors. Here it can be seen that these tend to be genre-specific. In contrast, the Periodicals corpus tends to use a wide range of metaphors, and a relatively high proportion of these are general to the language as a whole.

Generic metaphors in the Research corpus included the following:

battle, fuel, grow, growth, hurt, kill, steer weapon, war

in citations such as

7. Even though collusion *hurts* the efficiency of the firm, it may have some benefit in a dynamic context (Lafont & Martimort, 1997: 228).
8. They use environmental performance as a competitive *weapon* against other firms with fewer resources or means to keep up (Dowell, Hart, & Yeung, 2000: 1074).

Generic metaphors in the Periodicals corpus included:

animal, buttress, derail, engine, (rapid-)fire, fuel, gobble up, minnow, predator, prune

in citations such as

9. Do you thrive in environments requiring rapid-*fire* decisions, or do you prefer a more relaxed pace? (Klein, 2003: 6)
10. And as Western investment accelerates, Putin can argue to Russians that the only way to keep the money *flowing* is to continue advances in corporate governance and transparency (Starobin, 2001: 16).

Illustrating

Table 7 gives figures and percentages of the functions of genre-specific metaphors found in the two corpora.

As Table 7 indicates, illustrating is the least common function in the Research corpus, accounting for less than 2% of genre-specific metaphors. It is a more frequent function in the Periodicals corpus, but still only accounts for 10% of genre-specific metaphors. The low occurrence of this function is probably unsurprising in the Research corpus, given that the texts in this corpus are written by experts for experts. A higher proportion might have been expected in the Periodicals corpus. Other kinds of texts, with an explicitly pedagogical purpose such as textbooks, might be expected to have a higher proportion of illustrating metaphors.

For illustrating metaphors, the Periodicals corpus showed a high number of innovative metaphors such as the following:

11. As that generation passed like a large *animal* through the digestive tract of the American economy (Mr. Wood's herpetological metaphor), its numbers and sheer exuberance did much to drive America's consumption patterns and even its equity markets—at least until the bust at the end of the 1990s (Zeigler, 2003: 6).
12. Yet economies, like *drunks*, continue to move in wavy lines (Woodall, 2002: 5).
13. However, it has chosen to upgrade its voice network to handle data rather than use CDPD for the mass market. "[CDPD] is the *tank*, and it is never going to be a *race* car," says Richard J. Lynch, chief technology officer at Bell Atlantic's mobile operation (Elstrom, 1999: 132).

TABLE 7
Functions of Genre-Specific Metaphors in the Research and Periodicals Corpora

	Illustrating	*Modeling*	*Filling Terminological Gaps*
Research corpus			
Number of tokens	13	327	352
Percent of all genre-specific metaphors	2	47	51
Periodicals corpus			
Number of tokens	73	0	629
Percent of all genre-specific metaphors	10	0	90

In some cases, the cotext provides a signal to the function of the metaphor, through the use of metaphorical markers (Goatly, 1997), such as *like* in examples 11 and 14, and *kind of* in example 15.

14. "It was like *waving a red flag* at a *bull*," says Morton Bahr, president of the Communications Workers of America, IUE's parent union (Stires, 2003: 105).
15. The mood among the normally upbeat attendees was one of "a kind of general *malaise*," says Brian Clarkson, managing director of Moody's Investors Service (Silverman, Sparks, & Osterland, 1998).

Modeling

For the metaphor Vehicles searched for, no occurrences were found that had a modeling function in the Periodicals corpus. It is possible that this function was realized by different linguistic metaphors, but on the basis of our data it seems unlikely that the function occurs at all frequently, if at all. This is to be expected, given that periodicals do not usually aim to model new theory. In the Research corpus, modeling metaphors were relatively frequent, accounting for nearly half of all genre-specific metaphors. The majority of modeling metaphors we found expressed one of two kinds of economic model: games and predation.

16. We conduct our analysis within the context of a non-co-operative *game*-theoretical model with incomplete information (Fedderson & Gilligan, 2001: 151).
17. In a two-stage game, firms choose their level of quality at the first stage and the *game* represents a moral-hazard problem (Arella & Peitz, 2000: 5).
18. They undersupply incentives for *predation* deterrence, and as a result, the model shows that predation may occur in equilibrium (Faure-Grimaud, 1997: 851).

As noted, it was expected that modeling would turn out to be a significant function of metaphor in research articles. This confirms views expressed in the literature on economic discourse generally. What is interesting is that, as far as metaphor use is concerned, research articles apparently present an active engagement between reader and writer in comparison to periodicals. In the Research corpus, 49% of genre-specific metaphors are used to illustrate or model, yet 51% are used to fill terminological gaps, in most cases apparently simply referring. In the Periodicals corpus, 10% of genre-specific metaphors are used to illustrate, yet 90% are used to fill terminological gaps. This suggests that writers of research articles interact with their readers through metaphor more than do writers of periodical articles. To in-

vestigate this further, a detailed analysis of the function of all metaphors, including generic metaphors, would need to be conducted.

Filling Terminological Gaps

It was noted earlier that filling terminological gaps is a way of describing the role of the metaphor in relation to the language. In the Research corpus, 51% of genre-specific metaphors fell into this group, as opposed to 90% of genre-specific metaphors in the Periodicals corpus. There is very little overlap in the metaphors fulfilling this function between the two corpora. In the Research corpus, only 29 of 352 Vehicles that fill terminological gaps also occur in the Periodicals corpus; in the Periodicals corpus only 4 of 629 Vehicles with this function also occur in the Research corpus.

In the Research corpus, metaphors that fill terminological gaps tended to be derived from the source domains of life and journeys, as in the following examples:

19. In 1983, the "duopoly policy" prohibited any other entry to protect the *infant* Mercury during the next seven years (Faure-Grimaud, 1997: 869).
20. Owners realize that the shares of their firms will be widely held after the going-public date, so that manager control will be poor thereafter because of the familiar *free-rider* problems associated with dispersed shareholdings (Kerschbamer, 1998: 273).

Examples of this function in the Periodicals corpus include the following:

21. But, as industry after industry was streamlined and deregulated, the seeds of the 15-year *bull* market in America were sown (Bremner & Capell, 1997: 111).
22. Lead portfolio manager John D. Laupheimer, who has run the fund since 1993, describes it as a "conservative *growth*" portfolio looking to invest in blue-chip *growth* stocks "at the right price" (Laderman & Smith, 1999: 72).

CONCLUSION

By identifying metaphors in the sample corpora and searching for these across much larger corpora, we were able to identify a number of metaphor Vehicles, representing source domains such as life, war, and organisms, which have been shown in the conceptual metaphor literature (for example, Lakoff & Johnson, 1980) to be important to the language, and then to study the behavior of these in context. The data showed marked differences in the source domains, linguistic realizations, specificity, and function of metaphors across the two corpora studied. Our numeri-

cal results show differences in metaphor types and frequency between the two corpora, and the results of our detailed functional analysis show differences in use.

The high level of difference in linguistic realizations is surprising, given that the topics covered in the sample corpora were similar (though not identical), and that the corpora were large enough to yield 95 Vehicle types overall. The functional analysis suggests reasons for this difference. Firstly, a much higher proportion of linguistic metaphors in the Periodicals corpus are general to English rather than genre-specific. In relation to the Periodicals corpus, the texts in the Research corpus seem to avoid general metaphors. Of genre-specific metaphors in the Periodicals corpus, the majority fill terminological gaps, and the remainder are used to illustrate. Very few metaphors are used to illustrate in the Research corpus; the genre-specific metaphors are almost evenly split between those used to model and those that fill terminological gaps.

The subject matters of the corpora are related but not identical, but a more significant way that the two corpora differ is in their intended readerships. Writers of periodical articles and writers of research articles assume different levels of understanding of the subject matter, and a different motivation for reading, and so they will be setting up different relationships with the readers of each type of text. It seems logical that these differences would lead to differences in the functions expressed through metaphors, and that this, in turn, would lead to different linguistic metaphors sometimes being chosen. This research suggests, therefore, that the social context and purpose of a text is an important factor in metaphor choice, and possibly at least as significant as subject matter.

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