Variation and variability of economics metaphors in an English-Italian corpus of reports, newspaper and magazine articles

Maria Teresa Musacchio, Dipartimento di Lingue e Letterature AngloGermaniche e Slave, Università di Padova,
Khurshid Ahmad, School of Computer Science and Statistics, Trinity College Dublin

Introduction

Relevant contributions to the contemporary study of metaphor have come from cognitive linguistics, psychology, rhetoric and philosophy. Scientists have also helped to throw light on the functions of metaphors and metaphor-like processes either in science in general (e.g. Kuhn 1979) or in their own discipline (e.g. McCloskey 1988, 1995; Henderson 1982 for economics). Cognitive approaches such as Lakoff and Johnson's (1980) assume that basic metaphors are universal and not language-specific as they originate from central cognitive processes and structures of human thought. However, less central metaphors may be more specific and even universal ones can be somewhat culturally filtered (Gibbs 1999, Deignan 2005 and references therein). Cross-linguistic research to investigate the possibility that metaphors are not language-specific has shown that at least some of them are shared. Yet, cases were detected were no complete consistency could be found. In particular, studies of metaphors in economics texts in English, French and Dutch have shown differences that were ascribed to cultural factors (Deignan and Potter 2004).

Drawing on various strands of research, this paper aims to study metaphor in economics in two languages (English and Italian) and in two text types – economic reports and magazine or newspaper articles – and contrast the use of metaphorical processes in articles originally written in Italian and articles translated from English – the lingua franca of economics and finance – into Italian. The aim of the former investigation is to detect variation in the use of metaphors as a function of the purposes which different text types may serve. The hypothesis to be tested here is that reports as sources of economic information tend to use standard economic metaphors drawn from physics, health and medicine, change, war and weather, while magazine/newspaper articles as popular economics texts exhibit greater variability in metaphors (Musacchio 2008). The latter investigation has the objective to identify variation in terms of alternative metaphors, their construction and/or different frequencies in use in original as opposed to translated Italian articles. This part of the study is to a certain extent cross-linguistic, since it takes into account that differences in use may derive from an influence of the source language – in this case English – on the target texts.

Much of corpus-driven research on metaphor is Anglo-centric and relies on the existence of affect thesauri which were compiled a few decades ago (Devitt and Ahmad 2008). There are promising developments in the area of modern European languages, especially German and French, where digital dictionaries of metaphors are being developed; the long-running EuroWordnet (EWN) Project is starting to create metaphor databases together with national initiatives in Germany; particularly the work carried out under the rubric of Hamburg Database project is relevant here (Eilts and Lönneker 2002, Lönneker and Eilts 2004). The use of WordNet's template imposes its own limitations as far as metaphorical language is concerned. Over the last five or so years the Hamburg team has collated and annotated over 1500 examples of the use of non-literal language in form of a corpus of texts in German and French (Lönneker-Rodman 2008).

We explore possible answers to our research questions by using Harvard University's General Inquirer (GI) lexicon (Stone *et al.* 1966) and the words or (here: economic) terms it categorises as "Pos(itive)" and "Neg(ative)" as connoted semantic orientations in a specialist domain that can serve as probes for non-literal language. The categorization in Stone *et al.* dates back to the theory of semantic differentials and GI is now used extensively in the realm of *contents* management and encompasses fields as diverse as brand management and

terrorism studies (Ahmad 2009 and references therein). Stone's methodology is frequency based and those who use contents analysis believe that with a partially disambiguated frequency count one can judge the affect content of a text and indeed of a corpus of texts. There is a web-based system, called the *General Inquirer System* (see http://www.wjh.harvard.edu/~inquirer/3JMoreInfo.html for details), that uses the GI dictionary and can analyse the 'affect' content of a document.

We have been focusing on the relative affect content of a set of documents so as to say something quantitatively about the change in affect of a community (towards objects, Daly, Kearney and Ahmad 2009, and indeed other communities, Ahmad 2008b) over a period of time. For this Stone's method has been augmented by methods used in quantifying changes in the values of financial assets in econometrics and finance studies (Ahmad 2008a). Previously, we have used the so-called local grammar approach where corpus linguistic methods were used to extract candidate affect words by using collocation patterns of frequently used open class words in specialist text corpora; this method appeared to have worked well in languages as diverse as English, Chinese, Arabic and Urdu (Almas and Ahmad 2006, and Ahmad, Cheng and Almas 2006). More recently, we have attempted a translation of Stone's GI into German with interesting results for the correlation between changes in the affect content of a diachronic corpus of German financial texts and the changes in the Frankfurt Stock Exchange index, DAX (Remus, Heyer and Ahmad 2009).

So we have attempted a translation of the GI dictionary into Italian.These words/terms were translated into Italian by a mixture of human and machine translation. The culture and cross-linguistic research questions are also investigated by using phraseology extracted from an Italian dictionary of culture-bound metaphors (Castoldi and Salvi 2003). The study of Italian 'sentiment' words in a corpus of Italian economics and finance texts, contrasted with a the study of a similar sample of texts in American and British English, is part of a research project that deals with (a) how, if at all, one can translate a sentiment dictionary into a culturally-cognate language (English → Italian for example) and use this translated dictionary to gauge the (change in) affect in a corpus of texts in the target language; and (b) to evaluate the effectiveness of the affect change by looking at corresponding/correlated quantitative changes in objects that are described in the corpus by, say, correlating affect change with asset dynamics in financial markets.

Method

As mentioned above, the General Inquirer System, together with the GI dictionary, can be used to identify, count, print, graph and analyse statistically words and phrases that belong to categories specified by the investigator(s) (Stone *et al.* 1966: 68). In particular, we use the GI dictionary and a program developed at Trinity College Dublin (Daly, Kearney and Ahmad 2009), to study 'sentiment' by looking at a number of tags attached to words, namely *positive, negative, strong, weak, active,* and *passive*. This concurs with more recent research in appraisal (Martin and White 2005) and metaphor (Deignan 2005). The GI, Martin and White 2005 and Deignan 2005, are focused on the analysis of English language texts; the question then remains as to how a sentiment dictionary can be translated into a culturally-cognate language such as Italian.

Researchers in systemic functional linguistics situate appraisal – together with negotiation and involvement – within interpersonal meaning, i.e. the resources concerned with negotiating social relations or, in discourse semantics terms, 'how evaluation is established, amplified, targeted and sourced' (Martin and White 2005: 9). A given attitude is then realised through a range of grammatical categories (adjective, verb, adverb, etc.) and grammatical metaphor or more generally metaphor, which – as we shall see – are relevant to the expression of sentiment and its translation into a cognate language. Within appraisal, three domains are

distinguished – attitude, engagement and graduation. Attitude (2005: 34-5) is further divided into three regions of feeling: affect (construing emotional reactions), judgement (assessing behaviour according to normative principles) and appreciation (construing the value of things). Finally, Martin and White's study of appraisal is closely related to the quantitative investigation of stance (Biber *et al.* 1999: 966-986) as expression of personal feelings, attitudes, value judgements or assessments though paralinguistic, non-linguistic and linguistic devices such as lexis (adjective, verbs, adverbs) and grammatical devices (adverbials, complement clauses, modals, semi-modals, nouns + prepositional phrases and adverb + adjective or noun phrase).

Martin and White stress that attitude can also be expressed by means of figurative language and they provide the following example of the metaphorical use of the verb 'to herd' glossed by the simile 'like a mob of cattle' in an Australian government report on the treatment of indigenous people (2005: 65):

> I remember all we children being herded up, like a mob of cattle (…)

In her corpus linguistic study of metaphor, Deignan (2005: 147, 151) concurs by pointing out that a range of grammatical categories are probes to spot metaphors by searching collocates to identify lexical patterns and especially non-standard use. This is the case of adjectives such as *easy* and *tight* which in the English language of economics 'unusually' collocate with *money* to yield a metaphorical assessment of central-bank policies to increase or decrease the money supply with the aim of reducing or raising interest rates respectively. Interestingly, in a cognate language like Italian the same concepts are expressed through the grammatical metaphors – here: noun groups – *agevolazioni/restrizioni creditizie* while more direct equivalents such as *denaro più/meno caro* are only found in the press.

We attempt to bring together these strands of research and try to exemplify our method through examples. First, we identify a number of words/terms that we are going to analyse for sentiment and its variation and variability over time and as function of text type and purpose. Sample words/terms are listed in the table below to exemplify our method. Ticks or crosses indicate presence or not of the tag in the GI lexicon.

Word/term (translation)	**POSITIVE**	**STRONG**	**ACTIVE**
sostegno (support)	√	√	√
fiducia (confidence/trust)	√	√	X
rilancio (revival)	√	X	X
	NEGATIVE	**WEAK**	**PASSIVE**
calo (drop)	√	√	√
bisogno (need)	√	√	X
crisi (crisis/crises)	√	X	X

Table 1. Sample words/terms are used to study sentiment and derived metaphors.

We chose to limit our coverage to a particular kind of language to achieve a higher degree of accuracy by building on the 'idioms and idiosyncracies of language usage within a particular linguistic community' (Stone *et al.* 1966: 9). Our corpus consists of economics articles from the Italian daily *La Stampa* and has 3,203,547 tokens. Articles were published between 1995 and 2008. We worked on the idea that a sample of use can give an idea of a word's extension or class of reference objects, but more importantly of a word's intension or list of properties which allow to tag words as positive, negative, strong, weak, etc.

We first investigated words/terms that had a direct equivalent or main equivalent and whose three tags outlined in Table 1 above were all present. For example, we analysed *supporto* as positive, strong and active; and *calo* as negative, weak and passive. These words

have direct equivalents – *support* and *drop* respectively – which work in their literal and figurative meanings in both English and Italian. We then checked a sample of their use both in our *La Stampa* corpus and in other smaller corpora we have compiled. In particular, we ran concordances in a corpus of two economic reports by the Bank of Italy, a set of 80 articles originally written in Italian and published by general or financial Italian dailies (*Corriere della Sera, La Stampa, Sole 24 Ore*) and a set of 80 articles translated from *The Economist*, *The Financial Times* and *Project Syndicate* and published by the Italian financial daily *Sole 24 Ore* and by the Italian economic weekly *Economy*. We further analysed concordances of two IMF reports – *The World Economic Outlook 2007* and *2009* – and the 80 original English articles translated into Italian. For *supporto* and *calo* collocates are very similar in comparable text types. Reports are technical documents where words and phrases can be semantically redetermined to become terms or LSP phraseology. The most frequent phrase in articles is '*essere in calo*' (to be dropping) whereas in reports *calo* is premodified by an adjective or appears in compound terms such as *calo della domanda, calo degli investimenti*.

Overlap of English and Italian became more difficult as we considered words where one or two tags only were shared. With the positive *fiducia* (confidence) and the negative *bisogno* (need) the words' extensions are somewhat different. The main collocate of *fiducia* in translated articles is *fiducia dei consumatori/dei mercati* as in English texts *consumer/market confidence*. In original Italian articles and reports, however, the most frequent phrase is *clima di fiducia* (lit. 'climate/atmosphere of confidence'), a metaphorical phrase for consumer confidence. *Bisogno* (need) is a general language word used in the verbal phrases '*avere bisogno di*' and '*esserci bisogno di*'. As such it is a direct translation of *need* used as a verb in English, though in both English articles and reports *need* also appears as a noun in the collocations '*the need to/for*' while the corresponding Italian '*il bisogno di*' is comparatively rare. In Italian reports the fixed phrase '*in stato di bisogno*' (in a state of need/indigence) is also found.

Rilancio (revival) and *crisi* (crisis/crises) pose problems in their intensions connected to metaphorical use. *Rilancio* is literally a 'new launch', so it draws on the marketing concept of launching of product to project of idea of a relaunching development, an economy etc. The English *revival* draws on one of the standard areas from which figurative language is derived in economics – sickness, health, life cycle (Charteris Black 2000). Thus *rilancio* collocates with economy, development and investments, *revival* with business. *Crisi* forms a number of very similar compounds in both Italian and English – crisi finanziaria, crisi economica, crisi internazionale → financial crisis, economic crisis, global crisis – but is also used in newspaper articles with qualifiers as in '*profonda crisi*' (Engl. deep crisis) and in some rare metaphors such as '*crisi di fiducia*' with no direct equivalent in English. Finally, an interesting case is that of the Italian '*intervento*' which, if translated as 'assistance' in English is positive, strong and active and if translated as '*intervention*' is negative, strong and active. In terms of collocations, however, *intervento* is very similar to *intervention* when it forms compound terms (cf. *intervento pubblico/statale/dello stato → government/state/public intervention*) but quite different when it is used in more general and metaphorical contexts such as *linee/politiche/strumenti di intervento* where it is closer to the neutral word *measure/s*.

As can be seen, the degree of overlap warrants the use of an Italian translation of GI for the study of sentiment. A number of words and phrases were compared with metaphors in Castoldi and Salvi (2005). Even when figurative language came into play, in the language of economics references were broadly culture-bound as in the cases of *fiducia* and *intervento* outlined above. However, the references do not appear to extend to references to Italian heritage, history, literature and Greek or Latin mythology that might make sentiment and its phraseology very different from the English one.

Data Collection and Analysis

The analysis of the use of metaphorical terms is usually conducted 'by eye'- we have an experts' word for how metaphorical terms are used in a text or indeed in a text corpus. Recent developments in 'sentiment analysis' suggest that it is possible to extract these terms especially when used for constructing affect laden phrases or sentences – typically in a domain specific text. We will introduce a method of analysis that is focused on the diachronic change in the use of affect words in a time-ordered text corpus. Specifically, we look at newspaper texts that comprise economic news over two or more years. We use text aggregators like L*exis-Nexis*© to create a corpus of texts – the system involves the use of a selection of user-specified terms and a data source (typically the name of one or more newspapers). The texts are retrieved by the system and 'delivered' to the corpus-builder electronically in a single file. Individual news reports are separated by text markers like date/time/header etc. It is, therefore, not difficult to 'split the texts' and thence to create a corpus. The L*exis-Nexis*© system can select texts from (its) archives in a variety of ways: select any texts which may contain user terms anywhere in the texts, or if the terms appear in the headline, the terms should occur *n*-times and so forth.

We have analysed texts collected from the *New York Times* and *La Stampa*: in each case we had used the same kinds of terms: *economy/USA/United States* and *economia* and *Italia. New York Times* text was collected for a five year period (2004-2008, c. 4.43 Milllion words) and *La Stampa* texts spanned a period of 2 years (2007-2008, c. 1.5 million words).

We have looked at how positive and negative affect words are used in the two corpora using the GI (English) dictionary and our partial translation of the same (as discussed above). We wish to quantify the change in use and to this end we use methods developed in econometrics and finance studies, particularly we use the notion of *return* (r_t): the term has carried its original sense in econometrics and shows the return on 'investment' based on price (p) difference of a financial instrument (e.g. shares, bonds and so on) on two consecutive trading periods, t and $t+1$:

$$r_t = \log(p_{t+1}/p_t)$$

and the measure of change in the return over *n*-consecutive periods is given as the standard deviation of the returns over n-periods – usually indicated by v_n. Ahmad *et al.* (2008a, 2008b) have used the relative frequency of the negative and positive affect words to create a *return in (market) sentiment* and used the standard deviation of return to quantify changes in sentiment over a period of time. Given that *return* is a dimensionless number – being a ratio of the measure of the same quantity, then it is possible to see how return values and volatility of price of an instrument correlates with return values and volatility in sentiment.

Benoit Mandelbrot, the progenitor of the so-called fractals, has argued that there will be a clustering of the return patterns – large positive (negative) returns in prices and traded volumes of shares, for example, will be followed by large positive (negative) returns. There is some visual evidence of this kind of clustering in the sentiment returns – the proxy for sentiments, in our case, is the daily return of positive and negative words: the changes in returns is more pronounced for the negative affect words than is the case for positive affect words. We note that this is true of Italian news texts as it is of English texts (see Figure 1) and of German texts (Remus, Heyer and Ahmad 2009).

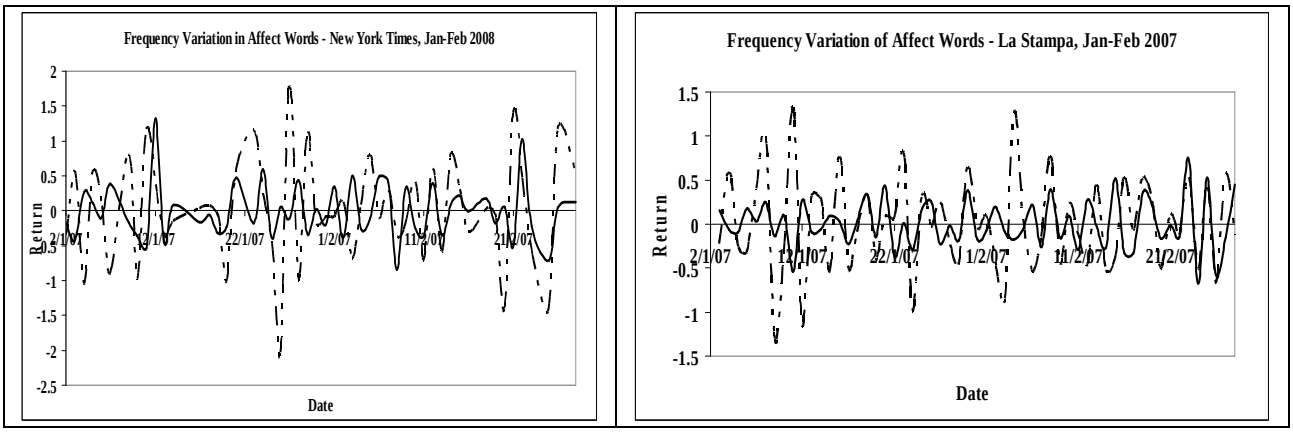

Figure 1. Variation of *positive* (full line) and *negative* (dashed line) **returns,** being the logarithm of the ratio of relative frequency on two successive days, in *New York Times* (left) and *La Stampa* (right) for a 2 month period – Jan/Feb 2007.

The visual evidence is subjective in many ways, the volatility or the standard deviation is more objective in comparison. We show below that the standard deviation of both positive and negative affect words changes over the two year period (January 2007 – December 2008) and it does so for both Italian and English economic news texts. The visual evidence (Figure 1) that the negative affect return series shows greater variation than the positive affect series, is confirmed by looking at monthly changes in standard deviation of the two series (see Figure 2). Again, we see similarities between the behaviour of positive and negative returns appears independent of the (natural) language.

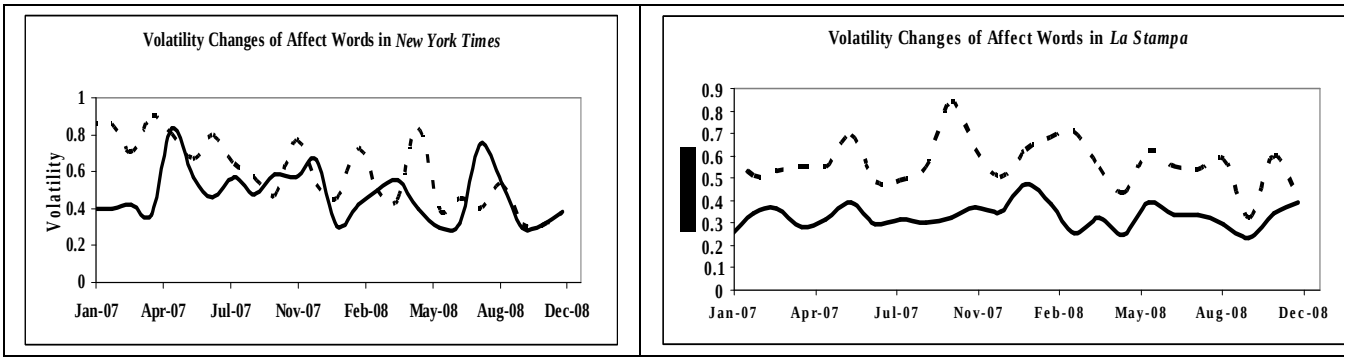

Figure 2. Variation of volatility, the standard deviation of daily *positive* (full line) and *negative* (dashed line) of the standard deviation of their respective returns, for *new York Times* (left) and *La Stampa* (right) for a 24 month period.

Conclusions

The results reported in this paper are a part of our more extensive research in examining the role of language in economics and finance; we have evidence that language plays a key role, the term used by some here is *constitutive*, and that language is not merely used as a conduit for transmitting and receiving information (language is not merely representational). The use of metaphors to describe changes in objects and events, whether they be shares and bonds on the one hand, *sentiment analysis* in financial trading, or the contents analysis of phone conversations (of communities) of people, in homeland security studies, is motivated by two interacting concerns. First, metaphorical information complements factual information as metaphors help articulate hopes, fears, aspirations and resignation amongst others. Second, metaphorical information needs a more systematic analysis much in the same way as factual information is analysed. The constitutive use of language for framing financial information

has serious implications as sometimes suggested in the context of the so-called *rogue traders* for instance.

Frequency-based work on creating affect time series, using metaphor dictionaries, does tend to ignore contextual and contradictory information. The later manifests itself in the use of language devices like negation. The intuition here is that the effort that a fully automatic analysis of texts involving resolving context and applying negation and intensifiers, for example, will not provide adequate return on investment.

We are pleased with the performance of our rather small sentiment dictionary for Italian. The GI dictionary used has nearly 2,000 negative and positive affect tagged words for analysing English language texts: we have 195 negative words and 250 positive words. The apparent language invariance in the behaviour of both returns and volatility is also gratifying and will allow us to use the analysis in near real-world conditions.

References

Ahmad K. (2008a) The 'return' and 'volatility' of sentiments: An attempt to quantify the behaviour of the markets? In: Ahmad K. (ed.) *Emotion, Metaphor, Ontology and Terminology, Marrakesh, Morocco*, 27 May 2008, Paris: ELDA.

Ahmad K. (2008b), Edderkoppspinn eller nettverk: News media and the use of polar words in emotive contexts. *Synaps*, Vol. 21, pp. 20-36.

Ahmad K. (2009) *Sentiment Analysis & Emotions and Metaphors: A Multi-disciplinary Perspective*. Heidelberg: Springer Verlag, (in press), 1-200 pp.

Ahmad K., Cheng D. & Almas Y. (2006) Multi-lingual Sentiment Analysis of Financial News Streams. In: Cozzini S., d'Addona S.& Mantegna R. (eds.), *First Int. Conf. on Grids in Finance, Palermo, Italy*, 3-4 February 2006, International School for Advanced Studies, Trieste.

Almas Y. & Ahmad K. (2006) LoLo: A system based on Terminology for Multilingual Information Extraction. In: Califf M. E., Greenwood M. A., Yangraber R. & Stevenson M. *COLING ACL 2006: Workshop on Information Extraction beyond the Document, Sydney, Australia*, 22 July 2006, Association of Computational Linguistics, pp. 56-65.

Biber D., Finegan E., Johansson S., Conrad S. (1999) The grammatical marking of stance. In: *Longman Grammar of Spoken and Written English*, London: Longman, pp. 966-986.

Castoldi M. & Salvi U. (2005) *Parole per ricordare. Dizionario della memoria collettiva*. Bologna: Zanichelli.

Charteris Black J. (2000) Metaphor and vocabulary teaching in ESP communities. *English for Special Purposes*, Vol. 19, pp. 149-165.

Daly N., Kearney C. & Ahmad K. (2009) Correlating market movements with consumer confidence and sentiments: a longitudinal study. In: Heyer G. (ed.) *Text Mining Services 2009*, Leipzig, Germany, 23 March 2009, Leipzig: Leipziger Beiträge zur Informatik, pp. 169-180.

Deignan A. & Potter L. (2004) A corpus study of metaphors and metonyms in English and Italian In: *Journal of Pragmatics*, 36, pp. 1231-1352.

Deignan A. (2005) *Metaphor and Corpus Linguistics*, Amsterdam/Philadelphia: John Benjamins.

Devitt A. & Ahmad K. (2008) Sentiment Analysis and the Use of Extrinsic Datasets in Evaluation. In: *Proc. of the 6th Intl. Conf on Language Resources and Evaluation, Marrakesh, Morocco*, 26 May – 1 June 2008, Paris: ELDA.

Eilts C. & Lönneker B. (2002) The Hamburg Metaphor Database. *Metaphorik.de*, 3.

Gibbs R.W (1999) Taking metaphor out of our heads and putting it in the cultural world. In: Gibbs R.W. & Steen G. (eds) *Metaphor in Cognitive Linguistics*. Amsterdam/Philadelphia: John Benjamins, pp.145-165.

Henderson W. (1982) Metaphor in economics. In: *Economics*, 18 (4), pp. 147-157.
Kuhn T. (1979) Metaphor in science. In Ortony A. (ed.) *Metaphor and Thought*. Cambridge: Cambridge University Press, pp. 409-419.
Lakoff G. & Johnson M. (1980/2003) *Metaphors We Live By*. Chicago: University of Chicago Press.
Lönneker B. & Eilts C. (2004) A Current Resource and Future Perspectives for Enriching WordNets with Metaphor Information. *Proc. of the 2nd Global Word Net Conference*, pp. 157–162.
Lönneker-Rodman B. (2008) The Hamburg Metaphor Database project: issues in resource creation. *Proc. of Language Resources and Evaluation*, vol. 42, pp. 293–318.
Martin J.R. and White P.R.R. (2005) *The Language of Evaluation. Appraisal in English*, Basingstoke/New York: Palgrave Macmillan.
McCloskey D. (1988) *La retorica dell'economia* (Italian translation of *The Rhetoric of Economics*). Torino: Einaudi.
McCloskey D. (1995) Metaphors economists live by. *Social Research*, Summer, http://findarticles.com/p/ articles/mi_m2267/is_n2_v62/ai_17464378 (last visited on July 3, 2009).
Musacchio M.T. (2008) Universal or Culture-specific Metaphors in Economics? A Corpus Study of Original vs Translated Italian. In: Ahmad K. (ed.) *Emotion, Metaphor, Ontology and Terminology, Marrakesh, Morocco*, 27 May 2008, Paris: ELDA.
Stone P.J., Dunphy D.C., Smith M.S., Ogilvie D.M. *et al.* (1966) *The General Inquirer: A Computer Approach to Content Analysis*. Boston: The MIT Press.
Remus R., Heyer G. & Ahmad K. (2009) Sentiment in German language news and blogs, and the DAX. In: Heyer G. (ed.) *Text Mining Services 2009, Leipzig, Germany*, 23 March 2009, Leipziger Beitrage zur Informatik, pp. 149-158.