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Contents

The AISB '99 Convention ................................................................. iii
  A. Patrizio, G. A. Wiggins & H. Pain

Symposium Preface ........................................................................ iii
  J. Barnden

Metaphor as categorisation: a connectionist implementation .................. 1
  M. Thomas & D. Mareschal

Mixing Metaphors .......................................................................... 11
  M. Lee & J. Barnden

A Formalism for Misantonyms ....................................................... 17
  E. Nissan

Metaphors in Comprehension and Reasoning Processes – An Analysis Based
  on the Discussion of the European Monetary Union in Italian and
  Portuguese Newspaper Articles ......................................................... 27
  A. Faulstich

The Continuum of Metaphor Processing ........................................... 35
  M. McGlone & H. Bortfeld

Processing Unfamiliar Metaphors in a Self-paced Reading Task ................. 41
  F. Brisard, S. Frisson & D. Sandra

Metaphor and the damaged brain: how research into the damaged brain
  can provide insight into normal literal and non-literal processing .............. 49
  K. Auyt & R. Varley

Metaphor in Design Discourse ......................................................... 56
  R. Coyle, D. Wizniewski & H. Park

Translating the Untranslatable. The Machine Translation approach to dealing
  with metaphorical utterances .......................................................... 61
  M. Harasimuk & P. Ywardzisz

The handling of metaphor in internal matching semantics ....................... 68
  R. Haussler

Shared session with Symposium on Creative Language: Stories and Humour

The costs and benefits of novel metaphoric references ................................ 73
  I. Noveck & M. Bianco

Grammatical Imaginations – A Historical Approach to Linguistic and Pictorial
  Metaphor ......................................................................................... 79
  I. Mittelberg

The role of imagery and novelty in the comprehension of nominal metaphors .... 87
  N. Caramelli & G. Venturi

Novelty in proverbs comprehension in adolescence ..................................... 94
  K. Wiejak

An intensional semantics for polysemy, sense extension and metaphor ........ 101
  C. Vogel

End of shared session

Metaphors and type theory ............................................................. 108
  J. van Genabith

Comparing two views of metaphor semantics ........................................ 113
  C. Vogel & J. van Genabith

Flowers, Vegetables, Fruits and Weeds: A Metaphorical Approach ............ 118
  M. Neagu
The AISB’99 Convention

The AISB’99 Convention has provided an opportunity to focus on one of the Cinderella’s of the AI world – the study of human creativity. The form of the event – a set of short symposia and workshops running concurrently – has made it possible to bring together a significant number of researchers interested in themes which, though normally considered different areas of AI and Cognitive Science, have in common the theme of creativity.

This, coupled with the contribution of invited speakers of the highest international calibre – Prof. Margaret Boden (Creativity and Evaluation), Dr. Ian Cross (Musical Creativity), Prof. Harold Cohen (Creativity in Visual Art) and Prof. Mark Turner (The Literary Mind), not to mention the many speakers invited to the individual symposia and workshops – has made the Convention an exciting and worthwhile event, as can be clearly seen from the quality of the work presented in this volume.

The Convention included symposia on Musical Creativity, Creativity in Entertainment and Visual Art, Creative Language, Creative Evolutionary Systems, Scientific Creativity, Imitation in Animals and Artifacts, and finally Metaphor, AI and Cognition. Alongside the explicitly creative focus, we are pleased to include in the Convention the 6th Workshop on Automated Reasoning, a Workshop on Reference Standards for NLP, and a Workshop on Teaching Cognitive Science to Undergraduates. The proceedings of all these events are published by AISB, whose Web site can be found at http://www.cogs.susx.ac.uk/aisb/.

The organising committee would like to thank Edinburgh Projects, the research wing of Edinburgh College of Art, and the Division of Informatics, University of Edinburgh for their generous support of the event. Our sincerest thanks also go out to the symposium chairs and committees, without whose hard work and careful cooperation there could have been no Convention. Finally, and by no means least, we would like to thank the authors of the contributed papers – including those which were regretfully not eventually accepted.

Andrew Patrizio, Geraint A. Wiggins & Helen Pain

The AISB’99 Symposium on Metaphor, Artificial Intelligence and Cognition

Metaphor has been shown to arise frequently and systematically in everyday text and speech, and in specific types of discourse such as educational interchange. It is also of great practical importance in various other areas of life, including graphical representation, music, visual art and computer interface usage. It is therefore an important concern for AI (and Cognitive Science generally). With the increasing use of computers in society, and the increasing relevance of AI to the development of people-friendly systems, the topic of metaphor must be given much more computational attention than it has been if such systems are truly to succeed.

Given the small extent of current research on computational work of metaphorical processing, it is pleasing to note that about a quarter of the papers in this symposium are on computational or formal accounts. A few further papers refer to corpus-based studies of a sort that could give valuable pragmatic guidance to the developers of computational accounts. Six other papers include a neurophysiological study and various psychological studies that, apart form their own intrinsic interest for Cognitive Science in general, can serve to guide theorizing about the nature of promising metaphor-processing algorithms. The remaining papers are linguistic studies, which can also provide valuable background for AI approaches to metaphor.

The areas of interest of the symposium included but were by no means restricted to:

- handling familiar (conventional) metaphor;
- handling novel metaphor;
- detecting metaphor in utterances, pictures, diagrams, etc.;
- metaphor-based reasoning;
- generating metaphorical utterances, diagrams, etc.;
- translation of metaphorical utterances;
- relationship of metaphor to analogy;
- relationship of metaphor to literal meaning;
- frequency of metaphor in discourse;
• relationship of metaphor to lexicons;
• effect of metaphor on comprehension, learning, etc.;
• effect of metaphorical views of computation, intelligence, etc. on the conduct of AI and cognitive science;
• mixed metaphor
• relationship of metaphor to other non-literal forms of expression or cognition.

Not all of these are represented in the papers, but they are all possible topics for discussion during the symposium.
I am grateful to the authors for their interest in the symposium and to the programme committee for their diligent work in the anonymous reviewing process.

John Barnden

Programme Chair:
John Barnden, Computer Science, Birmingham)

Programme Committee:
Richard Coyne, Architecture, Edinburgh, Scotland
Ann Dowker, Experimental Psychology, Oxford, England
Mark Lee, Computer Science, Birmingham, England
Tony Veale, Computer Applications, Dublin City University, Eire
Yorick Wilks, Computer Science, Sheffield, England
Metaphor as Categorisation: A Connectionist Implementation.

Michael S. C. Thomas¹ & Denis Mareschal²
¹Neurocognitive Development Unit,
Institute of Child Health, 30, Guilford St., London
²Centre for Brain and Cognitive Development,
Birkbeck College, University of London, Malet Street, London
M.Thomas@ich.ucl.ac.uk; D.Mareschal@bbk.ac.uk

Abstract

A key issue for models of metaphor comprehension is to explain how in some metaphorical comparison <A is B>, only some features of B are transferred to A. The features of B that are transferred to A depend both on A and on B. This is the central thrust of Black’s well known interaction theory of metaphor comprehension (1979). However, this theory is somewhat abstract, and it is not obvious how it may be implemented in terms of mental representations and processes. In this paper we describe a simple computational model of on-line metaphor comprehension which combines Black’s interaction theory with the idea that metaphor comprehension is a type of categorisation process (Glucksberg and Keysar, 1990). The model is based on a connectionist network depicting semantic memory (McClelland and Rumelhart, 1986). The network stores feature-based information about various concepts. A metaphor is comprehended by applying a representation of the first term A to the network storing knowledge of the second term B, in an attempt to categorise it as an exemplar of B. The output of this network is a representation of A transformed by the knowledge of B. We explain how this process embodies an interaction of knowledge between the two terms of the metaphor, how it accords with the contemporary theory of metaphor stating that comprehension for literal and metaphorical comparisons is carried out by identical mechanisms (Gibbs, 1994), and how it accounts for existing empirical evidence (Glucksberg, McGlone, and Manfredi, 1997) and generates new predictions. In this model, the distinction between literal and metaphorical language is one of degree, not of kind.

1 Introduction

Why use metaphor in language? Gibbs (1994) summarises three kinds of answers to this question (Fainsilber and Ortony, 1987; Ortony, 1975). First, the inexpressibility hypothesis suggests that metaphors allow us to express ideas which we cannot easily express using literal language. Second, the compactness hypothesis suggests that metaphors allow the communication of complex configurations of information to capture the richness of a particular experience. The use of literal language to communicate the same meaning would be cumbersome and inefficient. Third, the vividness hypothesis suggests that the ideas communicable via a metaphor are in fact richer than those we may achieve using literal language.

When we receive information coded in the form of a metaphor (e.g., not that Richard is brave, aggressive, and so on, but that Richard is a lion), how do we process such language to extract its vivid meaning? The traditional view in philosophy and linguistics was that language comprehension and production was built around literal language, that metaphorical language was both harder to comprehend (given that it is literally false – in our example, Richard is not a lion) and required special processing mechanisms to decode. Although it is distinguished by its communicative ad-
tener to comprehend what a given utterance means (Gibbs, 1994). That is, an apparently literal statement may well have an implicated meaning given a certain set of shared assumptions between speaker and listener. If both types of language involve similar problems, it makes sense to see them as engaging the same sort of mechanisms.

Black (1955; 1962; 1979) outlined three views of how the metaphor comprehension process may work. In the first of these, the substitution view, to understand the metaphorical comparison *Richard is a lion*, this comparison must initially be replaced by a set of literal propositions that fit the same context, e.g. *Richard is brave, Richard is aggressive*. In the comparison view, the metaphor is take to imply that the two terms are similar to each other in certain (communicatively relevant) respects. For example, both Richard and the lion are brave, aggressive, and so forth. The intention of the comparison is to highlight these properties in the first term *Richard*. In effect, the comparison is shorthand for the simile *Richard is like a lion*. In the interactive view, the comparison of the two terms in the metaphor is not taken to emphasise pre-existing similarities between them, but itself plays a role in creating that similarity. The topic (first term) and vehicle (second term) interact such that the topic itself causes the selection of certain of the features of the vehicle, which may then be used in the comparison with the topic. In turn, this “parallel implication complex” may cause changes in our understanding of the vehicle in the comparison.

Although the interaction view has been described as “the dominant theory in the multidisciplinary study of metaphor” (Gibbs, 1994; p. 234), it has nevertheless been criticised for the vagueness of its central terms (ibid., p. 235). One of the key issues for psycholinguistic models of metaphor comprehension is to explain the nature of the interaction between topic and vehicle that constrains the emergent meaning of the comparison. Three main models have been proposed. These are the salience imbalance model (Ortony, 1979), the structural mapping model (Gentner, 1983; Gentner and Clements, 1988), and the class inclusion model (Glucksberg and Keysar, 1990). The salience imbalance model proposes that metaphors are similarity statements whose two terms share attributes. However, the salience of these attributes is much higher in the second term than the first. The comparison serves to emphasise these attributes in the first term. The structural mapping model suggests that topic and vehicle can be matched in three ways: in terms of their relational structure (that is, in the hierarchical organisation of their properties and attributes); in terms of those properties themselves; or in terms of both relational structure and properties. People tend to show a preference for relational mappings in metaphors. Lastly, the class inclusion model proposes that metaphors are understood as categorical assertions. In a metaphor <A is B>, A is assigned to a category denoted by B (that is, Richard falls into the class of brave, aggressive things whose prototypical member is lions). Only those categories of which B is a member, which could also plausibly contain A are considered as the intended meaning of the categorical assertion.

The view of metaphor as a form of categorisation seems perhaps most consistent with the claim that metaphor comprehension requires no special processes over and above literal comprehension. Both the salience imbalance model and the structural mapping model imply a property matching procedure which is engaged for non-literal comparisons (Glucksberg, McGlone, and Manfredi, 1997). Moreover, Glucksberg et al. (1997) have argued that the class inclusion theory is empirically distinguishable from these property matching models. Although literal comparisons are asymmetric (in that the similarity of two terms can be rated differently depending on the order of presentation; e.g. Tversky and Gati, 1982), class inclusion statements should be more than asymmetric, they should be non-reversible. The *lion is Richard* should make very much less sense than *Richard is a lion*, unless Richard happens to be a prototypical member of a category of which lion could also be a member. Secondly, Glucksberg et al. claim that the topic and vehicle should make very different (though interactive) contributions to the metaphor’s meaning, but contributions which may be predicted. While the vehicle provides the properties that may be attributed to the topic, the listener’s familiarity with the topic constrains those properties which may be attributed to it. Glucksberg et al. primed comprehension of metaphorical comparisons by pre-exposure of either topic or vehicle. They predicted that only comparisons involving topics with few potentially relevant attributes, or vehicles with few properties available as candidate attributes, should benefit from pre-exposure. In their view, neither property matching model should predict these effects. Nevertheless, Glucksberg et al. (1997) find empirical support for both of their predictions.

In this paper, our aim is to propose a computational model of metaphor comprehension based on a categorisation device rather than a property matching device. Since the model will be based on a previously proposed mechanism of semantic memory, it exemplifies the idea that metaphor comprehension is not a “special” function of the language processing system. Indeed we suggest that within this mechanism, literal and metaphorical comparisons are distinguished only quantitatively, not qualitatively. The implemented model demonstrates in concrete terms how topic and vehicle interact in metaphor comprehension, addressing some of the vagueness in the interaction position. Lastly, we will show how the model accounts for both of the empirical findings demonstrated by Glucksberg et al., and how it generates new predictions.

First however, we will lay out the assumptions of the MPC (metaphor by pattern completion) model.
2 Assumptions of the model.

The model builds on the following assumptions:

1. The aim of comprehension is the on-going development of a semantic representation, and that representation is feature based.

2. The on-going semantic representation is continually monitored against expectations based on a common ground between listener and speaker. Specifically with regard to metaphor comprehension, the on-going semantic representation is monitored for degree of expected meaning change. (It will be monitored in other ways for other non-literal communication).

3. Comparisons of the form <A is B> are class inclusion statements where the intended meaning is that A is a member of category B and so should inherit its attributes (Glucksberg and Keysar, 1990).

4. The meaning produced by a metaphor is the result of using a categorisation mechanism to transfer attributes from B to A when A is not in fact a member of B. However, membership of B is not all-or-nothing but depends on degree of featural overlap.

5. The categorisation mechanism is an autoassociative neural network. Category membership is established by the accuracy of reproduction of a novel input A to a network trained to reproduce exemplars of category B. The output of such a network is a version of A transformed to make it more consistent with B.

6. Metaphorical comparisons must exceed some expected level of semantic distortion (for a given context) to be interpreted as metaphorical. As a result, not all feature changes are accepted as the communicative intent of the comparison. More specifically, the accepted features of the comparison are those initially non-zero features of the topic that are amplified by the transformation caused by the vehicle knowledge base.

7. "Metaphorical mappings caused by the topic may be learnt in the network storing the vehicle knowledge. The topic may become a (highly atypical) member of the vehicle category, so changing that category. Thus metaphors may either be computed on-line or retrieved from memory.

Before describing the details of the model, we wish to expand on two of these assumptions. The first is the idea that meaning can be described as a set of features, or in connectionist terms, a vector representation. Although there is some debate surrounding the legitimacy of feature vectors, much research has used vector-based semantic representations (e.g., connectionist models of word recognition – these models have successfully captured a great deal of empirical data in both normal and impaired language processing; Plaut et al., 1996; Plaut and Shallice, 1993). Using a semantic priming paradigm, McRae, Cree, and McNorgan (1998) generated empirical predictions the feature-based theory of lexical semantic representation and its main competitor, the hierarchical semantic network theory. The results supported feature-based accounts and McRae et al. concluded that 'lexical concepts are not represented as static nodes in a hierarchical system' (p. 681). Lastly, corpus based approaches have demonstrated that valid measures of word meaning can be generated using vector based co-occurrence statistics of the context in which words appear (Lund and Burgess, 1996). This has led to new theories of the acquisition of word meaning per se (Landauer and Dumais, 1997). While there are certainly problems with vector-based accounts (to which we will return), they are nevertheless an active theoretical approach to the representation of meaning.

The second assumption is that connectionist networks are a valid cognitive model of categorisation. Connectionist models have tended to take two approaches to categorisation (see e.g. Small, Hart, Nguyen, and Gordon, 1996). In one approach, the network takes object features as inputs, and maps to category names as outputs. In the other, a network is trained to simply reproduce the object features for the category it is storing. Category membership is tested depending on the accuracy with which a novel input is reproduced. An accurate reproduction indicates a high probability of category membership. It is the latter approach we will be adopting for our model. This approach has been used previously in models of the acquisition of word meaning (Plunkett et al., 1992) and of semantic memory (McClelland and Rumelhart, 1986; Small et al., 1996).

3 The MPC model.

The model below is simple and is primarily intended to illustrate the “metaphor as categorisation” approach. Figure 1 illustrates the model architecture. A three layer connectionist networks is trained to autoassociate (reproduce across the output units) semantic vector representations of exemplars from a number of different categories. Each category knowledge base is stored across a different set of hidden units. Metaphor processing is modelled by inputting a semantic vector for the topic to the part of the network storing a category of which it is not a member (i.e., the vehicle). The output of the network is a semantic representation of the
Pattern completion is a property of connectionist networks which derives from their non-linear processing (Rumelhart and McClelland, 1986). A network trained to respond to a given input set will still respond adequately given noisy versions of the input patterns. For example, if an autoassociator is trained to reproduce the vector <0, 1, 0, 0> and is subsequently given the input <0.2, 0.6, 0.2, 0.2>, its output is likely to be much closer to the vector it ‘knows’, perhaps <0.0, 0.9, 0.0, 0.0>. An input is transformed so as to make it more consistent with the knowledge that the network has been previously trained on. The connection weights store the feature correlation information in previously experienced examples. If a partial input is presented to the network, it can use that correlation information to reconstruct the missing features.

When processing metaphors, the input is not a noisy version of a pattern on which the network has previously been trained, but an exemplar of another concept. The output is then a transformed version of the topic, changed to make it more consistent with the knowledge stored about the vehicle. Metaphorical meaning emerges as a result of deliberate misclassification. As we will see shortly, the way in which a network transforms an input depends on that input. In this way, the model captures the interactivity between the terms of the metaphor.

For this simple model, we chose a small set of features with which to describe the concepts. In order to generate knowledge bases for separate concepts, the network was trained to autoassociate exemplars of each concept. For simplicity, we restricted the model to the forming of A is B metaphors between three concepts: Apples, Balls, and Forks. Two of these could plausibly be used in a metaphorical comparison (e.g. *the apple is a ball*), one of them much less so (e.g. *the apple is a fork*).

The concepts were defined by a set of prototypical tokens representing different kinds of apples, balls, and forks that could be encountered in the individual’s world (see Table 1). The network was not trained on the prototypes themselves, but on exemplars clustered around these prototypes. Exemplars were generated from each prototype by adding Gaussian noise (variance 0.15) to the original.

The exemplars for each concept formed three training sets used to develop the network’s three prior-knowledge bases ‘about’ apples, balls, and forks. The existence of a prior knowledge base is a necessary feature of metaphor comprehension. Prior-knowledge bases are analogous to Black’s (1979) “implicative complex” and reflect an individual’s personal experience with exemplars of each concept. The apple sub-network was trained to autoassociate patterns from 10 exemplars of each of three apple kinds (e.g., red, green, and rotten) for a total of 30 patterns. Similarly, the ball sub-network was trained to autoassociate 10 exemplars from three different kinds (for a total of 30 patterns). Finally, the fork sub-network was trained to autoassociate 10 exemplars from 1 kind (for a total of 10 patterns). Because there was only 1 kind of fork (as opposed to 3 kinds of both apples and balls), a single blank training pattern (zero input and output) was added to the fork training set to inhibit over-learning of the fork exemplars. All networks were trained with backpropagation using the following parameter values: learning-rate: 0.1, momentum: 0.0, initial weight range: ±0.5. Each sub-network (knowledge-base) was trained for 1000 epochs. All reported results are averaged over n=10 replications.

<table>
<thead>
<tr>
<th>Feature Sets</th>
<th>Colour</th>
<th>Actions</th>
<th>Shape</th>
<th>Texture</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts</td>
<td>R</td>
<td>G</td>
<td>B</td>
<td>W</td>
<td>E</td>
</tr>
<tr>
<td>Apples</td>
<td>1 0 0 0 0 0 1 2 1 0 3 7 4 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>red</td>
<td>0 1 0 0 0 1 3 8 0 3 7 1 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>green</td>
<td>0 1 0 0 0 1 3 8 0 3 7 1 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rotten</td>
<td>0 1 0 0 0 1 3 8 0 3 7 1 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balls</td>
<td>0 0 0 0 1 0 1 1 0 0 1 9 3 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>baseballs</td>
<td>0 0 0 0 1 0 1 1 0 0 1 9 3 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>beachballs</td>
<td>0 0 0 0 1 0 1 1 0 0 1 9 3 5</td>
<td></td>
<td></td>
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<tr>
<td>red</td>
<td>0 1 0 0 0 1 1 0 0 1 0 1 9</td>
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</tr>
<tr>
<td>green</td>
<td>0 1 0 0 0 1 1 0 0 1 0 1 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forks</td>
<td>0 0 0 0 7 0 1 0 0 1 0 1 7 3</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

After training, the network demonstrated prototype effects in each knowledge base. They responded most strongly to the prototypes for each category, despite never encountering them in training (cf. human performance, Posner and Keele, 1968). This suggests that
The Apple is a Ball

![Diagram showing input and output activation of semantic features for the metaphor "the apple is a ball".]

Figure 2: Transformation of semantic features by a metaphorical comparison.

The Apple, Ball, and Fork categories have been adequately learnt.

Metaphors were processed by the redirection of information flow into one knowledge base or another. The role of the 'is' in the <A is B> metaphors is to trigger that redirection.

3.1 Interaction between topic and vehicle.

Figure 2 shows the transformation of the semantic features of an apple concept for the metaphor the apple is a ball. The input is an exemplar of apple close to its prototype kind and is presented to the network storing knowledge about balls. The effect of this metaphor is to produce as output a representation of apple in which the suitability for throwing, the hardness, and roundness features are exaggerated, while the edibility feature is reduced and the colour features become more ambiguous. In terms of Glucksberg and Keyser’s class inclusion theory (1990), it could be claimed that a new category has emerged from this juxtaposition, namely [hard round things that can be thrown]. Alternatively, we could describe this transformation in terms of Black’s parallel implication complex. Either way, these modified features are a result of the interaction of the topic and vehicle. For example, note that despite the fact that 20 of the 30 Ball exemplars are soft beachballs, apple is still made to look harder rather than softer by this metaphor. This is because the apple is closer in size to a hard baseball than it is to a soft beachball. The semantic transformation is thus not a default imposition of ball features onto those of an apple, but an interaction between stored ball knowledge and the nature of the apple exemplar being presented to the ball sub-network. Thus, the model offers an instantiation of Black’s interactive theory of metaphor comprehension.

We can now attempt to formulate a clearer answer to the question of why in a metaphor <A is B>, should some features of B be transferred to A but not others? Let us assume that features x, y, and z tend to co-occur in exemplars of B. Transfer of feature z from B to A will occur only when features x and y are present in A. Concept A can ‘key in’ to a strong co-variance of features, thus triggering the pattern completion processes to transfer the additional feature. Pattern completion would cause the set of features to be completed. Such pattern completion is even more effective if z is already present to some extent in A, so that this feature only has to be exaggerated. Metaphorical comparisons are thus used to exaggerate existing features of the topic.

The transfer of features also depends on the strictness of co-variance in exemplars of B. Thus, if x, y, and z always co-occur, A is likely to inherit feature z when it already possesses x and y. However, if there are some exemplars of B which have x and y but not z, transfer is less likely. It may only occur if A shares other features of the exemplars of B which have x, y, and z.

In terms of the communicative advantage of metaphor, this model accords most closely with the compactness hypothesis. That is, vehicles embody a co-variance of features which, so long as the topic can key into them, may be transferred to the topic as a whole. Figure 2 demonstrates that the transformation of the features of the topic is a subtle one—features are not all or nothing, but enhanced or attenuated. It may also be that transformations of meaning of this sort cannot be achieved by the use of literal language alone. Thus the model may also accord with the inexpressibility hypothesis.

3.2 The reversibility of metaphors.

Glucksberg, McGlone, and Manfredi (1997) have claimed that metaphors are characterised by the property of non-reversibility, a property which only the class inclusion model can explain. The authors had subjects rate the sense of literal and metaphorical comparisons in original (sermons are sleeping pills) and
The Ball is an Apple

![Image of a graph showing input and output activation for semantic features: Colour, Actions, Shape, Texture, Size.]

Figure 3: The non-reversibility of metaphorical comparisons (see section 3.2).

reversed (sleeping pills are sermons) formats. The subjects also paraphrased the two versions – the forward and reverse paraphrases were then judged by the experimenters for how much sense they made. The results showed that literal comparisons were far more reversible than metaphors. Glucksberg et al. concluded that their data “provided strong support for the claim that metaphors and similes either lose or change meaning when reversed.”

Figure 3 shows the transformation for the metaphor the ball is an apple, the reverse of the metaphor in Fig. 2. The effect of comparing the ball to an apple is to exaggerate the softness and irregularity, and edibility of the ball, whilst reducing its likelihood of being thrown, its size, and its roundness. The semantic effect of this metaphor is different from that in the previous case despite the fact that, the feature overlap of ball exemplars and apple exemplars, is the same. The change in meaning between the forward and reverse metaphors, found in the empirical data, arises in the MPC model from the non-linear nature of its transformations. These transformations are not symmetrical.

Glucksberg et al. note that literal similarity statements are asymmetric – the rated similarity changes with the order of presentation of two terms – and that property matching models can account for this asymmetry by rating properties of the first and second term differently. However, Glucksberg et al. maintain that non-reversibility is different in kind than asymmetry, and that property matching models such as the salience imbalance and the structural mapping model cannot account for non-reversibility. We see literal and metaphorical comparisons as lying on a continuum, just as category membership can be graded rather than binary. We have shown elsewhere that an architecture similar to the MPC model is also able to account for the asymmetry in general similarity judgements (Thomas and Mareschal, 1997). Reversibility and asymmetry are also matters of degree. Support for this is provided by Sternberg, Tourangeau, and Nigro (1979) who found an inverse relationship between the similarity of two terms in a comparison and the aesthetic impact of that comparison.

3.3 Predictability of interactions.

Glucksberg et al. (1997) manipulated the ambiguity of vehicles and the number of potentially relevant attributes of topics in metaphorical comparisons. They primed comprehension of metaphors either with topic or vehicle. The results showed that when either ambiguity or number of potentially relevant attributes is constrained, subjects benefited from the prime, in terms of the time it took them to comprehend the metaphors. It is difficult to relate our current model to reaction time data. The simple mechanism depicted in our model is not the only mechanism involved in metaphorical comprehension. Other more complex mechanisms may contribute to a comprehension response time. Nevertheless, we are able in our model to systematically alter aspects of the topic or vehicle and demonstrate how the interaction is affected.

Figure 4 shows the metaphorical comparison the apple is a fork. Where there is little overlap between the concepts, the resulting output shows no strongly activated features, only a weak activation of the characteristics of a fork. Comparisons involving a narrowly defined vehicle with little similarity to the topic produce a weak and non-interactive metaphor.

Figure 5 shows the metaphorical comparison the ball is a fork for balls of various different colours. The results again show weak imposition of the forks characteristics, except when the ball is of the same colour of the fork. Here the topic can key into the narrow vehicle and evoke a stronger transformation.

Figure 6 shows the metaphorical comparison the ball is an apple, again for balls of various different colours. Here the vehicle, apple, is more ambiguous, in that it
The Apple is a Fork

Input

Output

Semantic Features

Figure 4: When metaphors fail: interactions between topic and vehicle (see section 3.3).

The Red vs Green vs Brown vs White Ball is an Apple

Input

Output

Semantic Features

Figure 5: The role of the topic in the interaction between topic and vehicle (see section 3.3).

The Red vs Green vs Brown vs White Ball is a Fork

Input

Output

Semantic Features

Figure 6: The role of the topic in the interaction between topic and vehicle (see section 3.3).
Figure 7: The role of the vehicle in interaction between topic and vehicle (see section 3.3).

has more widely varying prototypes. The resulting transformation is thus more interactive. Once more however, when the topic keys into a particular covariance in the vehicle (red and green apples are firm, rotten brown apples are soft), the nature of the transformation differs – brown balls are seen as softer as a result of this metaphor in contrast to red, green, and white balls.

Figure 7 shows the metaphorical comparison the apple is a ball, but now supplying contextual information to further specify the type of ball referred to in the vehicle. (This is implemented by providing a label to each type of ball during training). When the apple is compared to a baseball, the transformation is very different to when it is compared to a beachball. Nevertheless, both types of ball knowledge are represented over the same hidden units within the network.

These effects show that under certain circumstances, the nature of the interaction between topic and vehicle is predictable. With regard to Glucksberg et al.’s data, we might suggest the following explanation. A topic which has many potentially relevant properties (e.g. life is an) is less able to prime subsequent metaphors than a topic with few (e.g. temper is a _) since such a topic has many keys which could engage patterns of covariant features in the vehicle. Subsequent interactions are therefore less predictable. A vehicle with a variety of sets of co-variant features (e.g. is an ocean) is a less effective prime that one with few (e.g. is a crutch) since it has more patterns which could be keyed into by the topic. Once more, the interaction is less predictable. (Examples from Glucksberg et al., 1997).

3.4 Further predictions.

Our model makes the following testable predictions.

Two phenomena can be predicted on the basis of the way autoassociative networks generalise to novel patterns given their training set and the degree of training they have undergone. (1) A lack of variance in the exemplars of the vehicle category will reduce interactivity in metaphor comparisons – that is, it will produce the same transfer of attributes across a range of topics. (2) In the same way, over-trained or highly familiar vehicles will also generate less interactivity in metaphorical comparisons.

Below we suggest that literal and metaphorical comparisons are involve the same type of processing. For a metaphorical comparison, the listener does not accept the full meaning change implied by the comparison, but selects only features that have been enhanced. This suggests that there is feature change in a metaphorical comparison which is not reported by the subjects. We predict that (3) given a metaphorical comparison (e.g. my rock is a pet), subjects will show delayed responses to questions about features of the topic which they would nevertheless not report as aspects of the metaphorical expression (e.g. is a rock animate or inanimate?). Evidence for such implicit featural change would support the idea that the reported meaning of a metaphor is the tip of the iceberg of a process of featural enhancement which has much in common with literal language processing.

4 Discussion.

4.1 The relation of literal to metaphorical comparisons.

The MPC model uses a categorisation device to transfer attributes of the category onto a novel input. Categorisation causes a transformation of the input vector to make it more consistent with the category. Metaphor occurs when the novel input it not a member of the category to which it is applied. However, category membership is a graded notion and categories themselves have internal structure (Rosch, 1975). If we see metaphor as categorisation, it only requires a small step
to see literal and metaphorical categorisation as differing in degree rather than kind.

A literal comparison involves a novel input that is a member of the vehicle category. A metaphorical comparison involves an input that has some similarities to the category. An anomalous comparison involves an input which has few similarities to the category. Literal and metaphorical comparisons are related in how the semantic distortion caused by the categorisation process is then handled. If the distortion exceeds expectations, the comparison is taken to be metaphorical, and the communicative intent is taken to refer only to the features of the topic that have been amplified by the transformation. The same comparison may be taken as literal and all meaning change accepted as the communicative intent.

4.2 Criticisms of semantic feature explanations of metaphor.

The MPC model is based on simple semantic feature representations of concepts. Such representations have been criticised on a number of grounds as insufficient to explain the processes of metaphor comprehension. In this section, we consider a number of these criticisms.

(1) How can feature based representations deal with semantically non-deviant representations which are nevertheless metaphorical (Gibbs, 1994)? We refer the reader to the previous section.

(2) Feature based representations seem insufficient to deal with the complexities of sophisticated metaphorical expressions (ibid.). At the moment, this is certainly true. However, it is also true that we do not know what a more realistic feature based representation of meaning looks like. The representations in our model are undoubtedly too simple to deal with anything more than a few metaphors involving attribute mapping.

(3) The property transferred from vehicle to topic may not be a property of the vehicle itself (e.g. the girl is a lollipop may be taken to imply that she is frivolous – but lollipops are not frivolous)(ibid.). Furthermore, features must not themselves be metaphorical. For example, in the metaphor the legislative program was a rocket to the moon, we might think this implies that both are fast. But legislative programs and rockets are not fast in the same way (ibid.). One response for a feature-based account would be that semantic features are not lexical concepts. That is, in the previous example, a cluster of semantic features defines fast for the rocket, and a different cluster, though sharing many of the same features, defines fast for legislative program. This is the essence of sub-symbolic representation. However, work remains to be done on this account.

(4) Feature overlap accounts do not explain why metaphors have directionality (Gibbs, 1994). We refer the reader to section 3.2.

(5) Feature based or vector representations cannot deal with relational structure in concepts. Gentner (1983) has shown that adults previous topics and vehicles to be structurally related in metaphors. Again, this is an undoubted limitation of the current model. However, recent work in the connectionist modelling of analogy formation has shown how attributes may be dynamically bound to relational structure in a distributed network (Hummel and Holyoak, 1997). Such a network still exploits similarity based processing and pattern completion in forming and retrieving analogies. Moreover, Henderson (1998) has shown that such dynamically bound representations may be learnt in a neural network architecture. An interesting avenue of research will be to explain why children show a shift in preference from attribute mapping to relational mapping during development. Thus far, we have applied the MPC only to the emergence of the distinction between literal and metaphorical similarity in young children based on the maturity of their semantic representations (Thomas, Mareschal, and Hinds, under revision).

5 Conclusion.

In this paper we have introduced a simple and predominantly illustrative model of how metaphor comprehension may be explained as a form of categorisation (Glucksberg and Keysar, 1990). We have offered the beginnings of an answer to the thorny question of how it is that certain attributes are transferred from the vehicle to the topic in a metaphorical comparison, but not others. The answer was in terms of attributes the topic possesses which key into co-variances of features in the vehicle, and which pattern completion processes in a neural network allow to be transferred to the topic. This is an essentially interactive account, in line with Black (1979). The model is able to offer accounts for recent empirical evidence on the non-reversibility of metaphorical expressions, and the nature of the interaction between topic and vehicle (Glucksberg et al., 1997), and also to generate further testable predictions.

Lastly, in wider theoretical terms, the model conforms with the notion that metaphor comprehension requires no special processes over and above literal language comprehension, by suggesting that metaphorical language and literal language are differ points on a continuum of meaning change.

References


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Mixing Metaphors
Mark G. Lee and John A. Barnden
School of Computer Science,
University of Birmingham
Birmingham, B15 2TT
United Kingdom
mgl@cs.bham.ac.uk
jab@cs.bham.ac.uk

Abstract
Mixed metaphors have been neglected in recent metaphor research. This paper suggests that such neglect is short-sighted. Though mixing is a more complex phenomenon than straight metaphors, the same kinds of reasoning and knowledge structures are required. This paper provides an analysis of both parallel and serial mixed metaphors within the framework of an AI system which is already capable of reasoning about straight metaphorical manifestations and argues that the processes underlying mixing are central to metaphorical meaning. Therefore, any theory of metaphors must be able to account for mixing.

Introduction
The phenomenon of mixed metaphors has been largely neglected by previous research in metaphor understanding. This has been due to two prevalent assumptions. First, mixed metaphors are often regarded as examples of (at worst) pathological language use or (at best) poor style. Secondly, it is clear that the understanding of a mixed metaphor is more difficult than that of a single metaphor, since a mix requires reasoning about several vehicle domains.

In this paper, we wish to argue that the former assumption is wrong: mixed metaphors are common in mundane everyday discourse and can be understood by hearers without recourse to specialised reasoning. In addition, the second assumption is detrimental to long term progress since mixed metaphorical manifestations rely on straight metaphors. More specifically, this paper makes the following claim: the reasoning processes and data structures involved in understanding mixed metaphors are identical to those used in understanding straight metaphors. Therefore, current research on metaphor processing should be capable of being extended to deal with mixed phenomena and mixing can provide valuable insight into the processes underlying straight metaphors.

To this end, this paper describes some initial work done with ATT-Meta (Barnden, 1997) to handle various types of mixing and reprises an earlier claim for the need for within-vehicle reasoning and the use of conversion rules to filter the relevant connotations of a particular metaphor.

Mixed metaphors are often regarded as humourous or cases of defective speech. Consider the following pathological sentence, quoted by Fowler (Fowler, 1908):

1. "This, as you know, was a burning question; and its unseasonable introduction threw a chill on the spirits of all our party."

In example 1, the question is metaphorically "hot". However, its introduction makes the party's spirits "cold". Despite this contradiction, the sentence can be understood to mean that the question was somehow controversial and its inappropriate introduction saddened the emotions of the party members. Fowler criticised such examples as poor style. However, despite the conflict between "hot" questions and "cold" emotions, the connotation of the sentence can be easily understood since it alludes to two well-known metaphors, i.e. "DIFFICULT QUESTIONS ARE HOT OBJECTS" and "SAD EMOTIONS ARE COLD OBJECTS". Furthermore, it is unlikely that most native speakers would even consider the disparity of "hot" questions causing "cold" reactions. This is because, in each case what is mapped is not an instance of temperature change, but a connotation with direct relevance to the tenor domain.

In this paper, we will argue that it is often necessary to do extended reasoning prior to mapping from vehicle to tenor. Therefore, a capacity for within-vehicle reasoning is essential and any conversion must also act as a strict filter to limit the range of metaphorical meaning.

The paper is structured as follows: in Section 2, we will outline and distinguish two key types of mixed metaphor: serial and parallel. In Section 3, we will briefly outline ATT-Meta and provide an analysis of each type of mixed metaphor which our program is capable of dealing with and then in Section 4 extend the discussion
to other types of mixes and the wider issues facing mixed metaphor research.

2. Mixed metaphor distinctions

It is possible to distinguish two types of mixed metaphor: parallel mixes and serial mixes. In a parallel mixed metaphor, the tenor (A) is seen as a vehicle (B) and then as a second vehicle (B'). In a serial mixed metaphor, the tenor (A) is seen as a vehicle (B) which is then seen as a different vehicle (C). The key distinction is that in parallel mixes the two metaphors do not metaphorically interact and in serial mixes, they do. For example, consider the following two mixed metaphors:

2. "The critique shed light on the theory's shaky foundations."
3. "One part of John hotly contested the verdict."

The utterance in 2 manifests two metaphors: "MENTAL INTERACTION AS VISION" and "THEORIES AS BUILDINGS" (Lakoff and Johnson, 1980; Grady, 1997). However, what is novel is both metaphors are being applied in the same sentence. Following the definition given above for parallel mixes, the following domains are involved:

A: Domain of theories, ideas, arguments etc.
B: Domain of light/perception.
B': Domain of buildings.

If ideas are light sources then a critique can shed light on a theory so that observers can "see" aspects of a theory. In this instance, the "light source" of the critique allows them to see the weak foundations of the theory. Weak foundations in a building suggest that the building itself might collapse, therefore, if theories are buildings then their weak foundations may cause the entire theory to collapse, or literally, be refuted. The above sentence can be unravelled by treating the different metaphorical vehicles separately since each applies to a different aspect of the tenor domain, i.e. the critique and the theory itself.

It is worth noting that the metaphor "MENTAL INTERACTION AS VISION" might itself be a combination of two familiar metaphors: "IDEAS ARE LIGHT SOURCES" (Lakoff and Johnson, 1980) and "UNDERSTANDING AS SEEING". We will return to this point in Section 4.

The utterance in example 3 also manifests two familiar metaphors: "MIND PARTS AS PERSONS" (Barn- den, 1997) (see also, Lakoff's metaphor "IDEAS ARE ENTITIES" (Lakoff, 1993)) and "ANGER IS HEAT" (Lakoff and Turner, 1980). In the "MIND PARTS AS PERSONS" metaphor, the mind is composed of different parts which may have different beliefs, intentions and personalities. Mentioning that "one part" of John contested the verdict suggests that there exists more than one part and that some other part of John did not contest the verdict. Moreover, the part of John referred to contested the verdict "hotly". In the "ANGER AS HEAT" metaphor, anger is seen as heat. Therefore, the "part" of John which contested the verdict did so with anger. Following the definitions given above, the following domains are involved:

A: John's mental/emotional states.
B: Domain of people/NL communication.
C: Domain of heat.

Example 3 is a serial mixed metaphor. The "ANGER AS HEAT" metaphor (B as C) acts on the "MIND PARTS AS PERSONS" metaphor (A as B) to directly affect its metaphorical meaning. Therefore, it is not possible to isolate the two metaphors as in example 2. This is an important point: it could be argued that the "ANGER AS HEAT" metaphor applies directly to the contesting by John and not just to the part of John involved in the contesting. Given the definitions above, this would classify

![Figure 1. Serial and Parallel Mixed Metaphors.](image-url)
example 3 as a parallel mix. However, viewing the utterance as a parallel mix misses a subtle distinction which we wish to capture. The sentence is ambiguous: either one part of John is contesting the verdict and one part is not, and the part contesting is doing so "hotly" or both parts of John are contesting the verdict but only one is doing so "hotly". Our intuitions suggest that the former interpretation is the default one and we will only provide a detailed analysis for this interpretation. However, our treatment is sensitive to such distinctions (as is our computational implementation) and is capable of reasoning about such uncertainties.

Figure 1 represents both examples schematically. Example 2 has two metaphors which act as parallel vehicles on the (literal) tenor domain. However, in example 3, one metaphor (B as C) acts directly on another (A as B). This metaphor is then applied to the tenor. The next section, a computational account dealing with both kinds of mixed metaphor will be developed based on these distinctions.

3. A Computational Account

The work presented here is within the ATT-Meta model of metaphor comprehension. This paper will only detail the concepts relevant to the current work but further details can be found in (Barnden, 1997a).

ATT-Meta is an AI system capable of both simulative reasoning about beliefs and metaphorical reasoning. Reasoning is done by the use of back-chaining rules of inference which allow differing degrees of certainty. Nested reasoning is allowed to facilitate simulation of other agents. In addition, metaphorical reasoning can be nested within simulative reasoning. As the account which follows suggests, such capabilities are central to understanding mixed metaphor. Two types of nested space are maintained: simulation-pretence cocoons and metaphor-pretence cocoons. Simulation-pretence cocoons are used to model the beliefs of other agents. Metaphor-pretence cocoons are a special type of simulation-pretence cocoon where the agent modelled is hypothetical and is assumed to believe the manifested metaphor is literally true.

Knowledge of different domains is encoded in sets of facts and rules which apply to a particular domain. Since metaphors involve a mapping from one domain (the vehicle) to another (the tenor), ATT-Meta uses conversion rules which explicitly map terms from one domain to another. Therefore, any conventional metaphor can be defined by first constructing a set of rules to represent the vehicle domain plus a suitable conversion rule or a small set of such. Understanding proceeds by creating a metaphor-pretence space then mapping any implication to the tenor domain.

An important aspect of the conversion rules is that their degree of certainty can be represented. This for any reasoning about a metaphor to be defeasible and for conflicts between different domains to be handled using general conflict resolution techniques.

So far, the above is common to a number of computational approaches (e.g. (Martin, 1990)). However, ATT-Meta is distinctive in that it licences extensive within-vehicle reasoning in addition to more common, within-tenor reasoning. Rather than simply mapping a correspondence from the vehicle to the tenor and then performing inference to fully understand the connotation of an utterance, ATT-Meta favours extensive inference prior to mapping. As we shall see, this gives any conversion rule the important function of filtering out non-relevant parts of a particular metaphor. This is essential for metaphor-pretence spaces to be chained in a sensible manner.

3.1. Parallel Mixed Metaphors

As discussed in Section 2, example 2 relies on two familiar metaphors. Considering the former: "IDEAS ARE LIGHT SOURCES", we assume that ATT-Meta is familiar with the metaphor and so knows the following two-way correspondence:

Conversion Rule: (See-Believe)

Seeing an idea corresponds to Believing an idea.

In addition, suppose ATT-Meta believes the following rule concerning the vehicle domain of "seeing":

(Illumination) If physical object X is lit by a light source, then X can be seen.

Secondly, we assume that ATT-Meta is familiar with the metaphor "THEORIES AS BUILDINGS" and so, as part of this familiarity, knows the following two-way correspondences:

Conversion Rule: (BuildingsareTheories)

Buildings correspond to Theories.

Conversion Rule: (Instability)

If X is a theory which is being seen as a building then X is unstable maps to X is implausible.

In addition, that ATT-Meta has the following rule about real buildings:

(Stability): If X is a building and its foundations are weak, then the building is unstable.
Given the above rules, it is possible to infer the connotation that “the critique claimed that the theory was implausible” by the following steps of inference:

1. Construct a metaphor-pretence cocoon where the metaphor “Believing is Seeing” holds.
2. In this space, assert that the critique literally shines light on X where X is the situation described by the remainder of the sentence.
3. Using the Illumination rule, infer that X can therefore be seen.
4. Map that X can be seen to the tenor domain as X can be believed to be true using the Conversion Rule (See-Believe).
5. Construct a metaphor-pretence cocoon where the metaphor “Theories are Buildings” holds.
6. In this space, assert that the theory’s foundations were literally unstable.
7. Using the Stability rule, infer that the theory itself was unstable.
8. Map that the theory is implausible using Conversion Rule (Instability).
9. Combine 4 and 8 by substituting the theory’s implausibility for X to infer the connotation that the critique licenced the belief that the theory was implausible.

Notice the above analysis allows both instances of metaphor to be reasoned about separately before their literal connotations are combined by a simple substitution. As we shall see in the next section, serial mixes are more complex.

### 3.2. Serial Mixed Metaphors

As discussed in Section 2, example 3 relies on two familiar metaphors. Considering the former: “MIND PARTS AS PERSONS”, we assume that ATT-Meta is familiar with the metaphor and so knows the following two-way correspondence:

**Conversion Rule: (MindpartsArePersons)**

If person P is viewed as having a part X that is a person, then a motivation/idea of X is a motivation/idea of P.

In addition, some general knowledge is required specifying that when “one person” is mentioned in discourse, then it is reasonable to assume that there is at least more than one person present. This could be analysed as a form of scalar implicature (see, (Hirschberg, 1985; Lee, 1998)). However for the purposes of this paper it is sufficient to use the following defeasible rule in the metaphor domain:

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1. We make no strong claims as to the psychological ordering of the reasoning steps.

### SeveralPeople:

There is more than one person.

Regarding the second metaphor “ANGER AS HEAT”, it is essential to have the following two-way correspondence:

**Conversion Rule: (HeatisAnger)**

Heat proportionally corresponds to emotional anger states.

There is now sufficient information to tackle the serial metaphor. However, unlike the example 2 above, it is not possible to deal with each metaphorical manifestation separately. Instead each metaphorical-pretence cocoon must be chained. Given the above rules, it is possible to infer the connotation that “John had one motivation to angrily challenge the verdict” by the following steps of inference:

1. Construct a metaphor-pretence cocoon M1, where the metaphor “MIND PARTS AS PERSONS” holds.
2. Construct a metaphor-pretence cocoon M2, where the metaphor “ANGER AS HEAT” holds.
3. In M2, assert that PartoJohn1, literally, hotly contested the verdict.
4. Map from M2 to M1, that PartoJohn1, literally contested the verdict angrily, using Conversion Rule (Heat is Anger).
5. Map from M1 to the Tenor domain, that PartoJohn1 corresponds to one motivation of John using the Conversion Rule (MindpartsArePersons).

It is also possible to infer that there is “more than one person in John’s head” i.e.:

6. Using the SeveralPeople rule, infer that there is more than one person PartoJohn2.
7. Map from M1 to the Tenor domain, that PartoJohn2 corresponds with some other motivation of John.

It can be argued that example 3 implies that the other motivation of John is not to contest the verdict. This is, however, another scalar implicature and therefore, not part of the metaphorical analysis of the sentence. However, what ATT-Meta can infer, is that in this context, there is another motivation and this motivation may (or may not) be contrary to the first.

### 4. Further discussion

In Section 3, two types of mixed metaphor were analysed using the same techniques and conceptual structures which have been applied previously to straight metaphors. However, there are some issues particular to mixed metaphor.
It is clear that parallel mixes present less difficulties to any pre-existing theory of metaphor than serial mixes. This is due to the lack of interaction between the two metaphors involved. However, this is not to say that parallel metaphors operate in total isolation. Certain parallel mixes are more common than others. For example, metaphors which refer to abstract entities as physical objects are often mixed with spatial metaphors e.g.:

4. John pushed the ideas to the back of his mind.

Example 4 uses two familiar metaphors: “IDEAS AS PHYSICAL OBJECTS” and “MIND AS ENCLOSED SPACE”. However, it is not clear whether such examples are instances of live mixing. There are two reasons for doubt. First, such examples can often be termed dead mixes i.e. mixes which have been so conventionalised that there is no need for any extra reasoning to combine the two familiar metaphors. This, however, is not to suggest that the individual metaphors are dead, only that the mix is so familiar that any metaphorical reasoning is performed in the same metaphor-pretence cocoon which represents the conventionalised mix of the metaphors.

Secondly, it is not clear whether the level of representation of conceptual metaphors is universal. It is conceivable that two different native speakers may represent the same metaphor with different levels of granularity and in some cases, a manifestation might be mixed to one speaker and straight to another. Therefore, to avoid such issues, we have adopted a position of methodological solipsism (Fodor, 1980) with respect to the particular set of metaphorical concepts assumed and focused on the actual processes and types of data structures involved in reasoning about metaphors. Either case could be made for example 2. It is arguable if there is an actual novel mixing of “IDEAS AS LIGHT SOURCES” and “UNDERSTANDING AS SEEING” or simply a dead mix which could be termed “MENTAL INTERACTION AS VISION”.

In our brief references to parallel mixing in earlier work (e.g. (Barnden, 1997a)) we have suggested that such mixes can be handled by having a single metaphorical pretence cocoon, instead of the two assumed in the present paper. In the one-cocoon approach, information in the two vehicle domains can interact (this could be seen as a form of “blending” (Turner and Fauconnier, 1995)). Sometimes such interaction is benign and easy to perform, as in the case of a dead mix, and sometimes fought with conflict (as in example 1). It is a matter of further research to combine the one cocoon and two cocoon approaches to parallel mixing.

In serial mixes, the metaphors strongly interact. If the analysis provided in Section 3.2 is correct, and serial metaphors work by the chaining of one vehicle domain to the other vehicle domain to the tenor, then conversion rules provide an explicit constraint since a sensible mapping is required from the first vehicle to the second vehicle. Therefore, mixing of conventional metaphors is only possible if a conventional mapping exists between the two domains.

By this view, conversion rules act as filters between domains. First, to constrain the types of serial mixed metaphor possible. Secondly, to constrain the types of information transferred since only metaphorical manifestations which make sense in the other metaphor pretence cocoon can be mapped.

In previous work, it has been assumed that generality in conversion rules and mapping is a good thing. However, given this filtering role, specificity is an advantage since it provides strong constraints on mixing. Clearly, within-vehicle reasoning is important here. If more specific conversion rules were favoured then more of the reasoning workload must be performed prior to mapping to the tenor domain.

We have argued previously that contradictions between vehicle and tenor domains can be dealt with using general conflict resolution techniques. Mixed metaphors, however, are more complex. As shown in example 1, a sentence can involve two literally contradictory metaphorical manifestations yet still make sense. This is because only the connotations of each metaphor interact, not the metaphors themselves.

Conclusions

In this paper, we have described some initial work on mixed metaphors. This paper has argued that both types can be processed using basic AI reasoning techniques which have already been applied to cases of straight metaphor, and in particular, the nesting of simulation and metaphor-pretence cocoons. We have suggested that within-vehicle reasoning plays an important role in mixing so that the connotation of each metaphor can be established prior to mapping to avoid contrary but mixed metaphors from conflicting.

References


A FORMALISM FOR MISANTONYMY

Ephraim Nissan
School of Computing and Mathematical Sciences, University of Greenwich,
Wellington Street, Woolwich, London SE18 6PF, U.K.
E.Nissan@greenwich.ac.uk http://www.gre.ac.uk/~E.Nissan

A formal concept of misantonymy is found to capture (at least, in a prototype theory sense) a fairly broad class of neologization which is most often done in a somewhat humorous vein. The device is based on mock-literal opposition between components of the pair of terms (which is sometimes a pair of compounds), where the neologism is patterned after the extant term.

1 The Formula

In this paper, we discuss a class of terms (or phrases), \( w_1 \) and \( w_2 \), such that \( \text{time}(\text{coined}(w_2)) > \text{time}(\text{coined}(w_1)) \), and moreover, the coinage of \( w_2 \) is arguably to be perceived as having responded to the existence of \( w_1 \) in such a way that an "improper" kind of replacement by contrast (that will be better defined in the following) can be shown to have taken place, in a more or less humorous vein. I call such pairs misantonyms, and note this as: \( w_1 \prec \ " \succ \" \ w_2 \). I call mistration the process of patterning misantonym \( w_2 \) (the reverse) after a model term, \( w_1 \) (the opposite). Because of lexicalization, we cannot form the contrary of a compound\(^1\) the way we could compose the opposite of a freely formed phrase: "black' is the contrary of 'white', in given acceptations (i.e., word senses) and contexts of use, whereas 'Black Sea' (a proper name) is a lexicalized compound, and we cannot usually oppose it to 'White Sea' (other than in a conceptualization of Russia and Ukraine's coasts by opposing extreme latitudes), the way we could formally derive 'a white X' in opposition to 'a black X'. Nevertheless, a rarely instantiated heuristic of contrary formation adopts that very course, notwithstanding lexicalization. This will be our topic in this paper.

Example 1: The Turkish name for the Black sea is Karadeniz, from kara ("black") and deniz ("sea"). Instead, the other sea of Turkey, the Mediterranean, is called Akdeniz, i.e. literally "the White Sea", where "white" is there arguably by mere contrast. \[\text{We'll call this Akdeniz is patterned by misantonymy after Karadeniz.}\]

Another befitting example, though of just fleeting neologization, is Ex. 2: the title of a paper, "Enter-tainment and exit-tainment", by J. Bier (1995). \[\text{Once we've introduced a formalism, we'll proceed to show that it applies to a reasonably broad array of instances, either puns or other terms. Moreover, in the sense of cognitive and linguistic prototypes (Nissan, 1995) its application may be central or peripheral.}\]

By assuming discreteness for simplicity (and in line with my own formalisms of word-formation since the 1980s), let \( \Omega^n_T \equiv \{ A_1, A_2, \ldots, A_{n_T} \} \) be the set of \( n_T \) acceptations of term \( T \) that is, the set of its discrete word-senses (disregarding here arguments against the discreteness of lexical senses (Boguraev and Pustejovsky 1993)).

Let \( A_i \in \Omega^n_T \). that is, we consider a particular sense of the given term. Let function \( \text{lit}(F) \) yield the set of literal senses (possibly, a singleton) of a given formation \( F \), which in turn is a word, term, root or string yielded by a particular instance of a given kind of term synthesis or analysis from word-formation.

Let \( m_F \) and \( p_T \) be integer cardinalities.

Let \( \text{lit}_k(F) \in \text{lit}(F) \), where \( 1 \leq k \leq m_F \), and (referring to the various given subclasses of word-formation or analysis (Nissan, 1999a), e.g., morphological derivation of folk- etymology, which we included in \( F \) let \( \alpha \equiv L_{1,k} := \text{lit}_k(\text{w}(T)); \)
\( L_{\beta} \equiv L_{2,b} \equiv L_{3,k,l} := \text{lit}_k(\text{folketym}(T)); \)
\( 0 \leq l \leq q_T; \quad S_r \in \text{substrings}(T); \quad 0 \leq r \leq p_T; \)
\( L_{\gamma} \equiv L_{3,\epsilon} \equiv L_{3,k,l,r} := \text{lit}_k(\text{folketym}(S_r)); \)

- where function \( \text{w}(T) \) is the word-formation (by morphological derivation or compounding or otherwise) of term \( T \) and \( L_{1,k} \) is the, or one, literal sense of \( T \) according to the way \( T \) was formed;
- where function \( \text{folketym}(U) \) is an analysis yielded by a particular folk-etymology (indexed by \( l \) of those conceived, and different from \( \text{w}(T) \), the recognizedly true (if any) word-formation of \( U \);
- where \( S_r \) can be generalised if we replace its definition \( S_r \in \text{substrings}(T) \equiv \Sigma^1 \) with: \( S_r \in \Sigma \) where \( \Sigma \equiv \Sigma^1 \bigcup \Sigma^2 \) and \( \Sigma^2 \) is a set of strings of which \( T \) itself is a substring; which leads to \( L_{\delta} \) instead of \( L_{\gamma} \);
- and where, out of notational convenience, we adopt one index for a multidimensional value. The notational convention by which of one index replaces...
We say that
\[ j' = n_{T'}, j'' = n_{T''} \]
holds if:
\[ j' = 1, j'' = 1 \]
where \( \mathcal{X} \) is:
\[ \left( \left( L'_{\xi'} = \text{contrary}(L''_{\xi''}) \right) \land \neg \left( A''_{\mu'} \text{ rel } L''_{\xi''} \right) \right) \]
Equivalent formulation:
\[ j' = n_{T'}, j'' = n_{T''} \]
\[ j' = 1, j'' = 2 \]
where \( \mathcal{Y} \) is:
\[ \left( \left( L'_{\xi'} = \text{contrary}(L''_{\xi''}) \right) \land \neg \left( A''_{\mu'} \text{ rel } L''_{\xi''} \right) \right) \]

2 A Repertoire of Examples

Example 1: Turkish Karadeniz \( \prec \) “\( \succ \)” Akdeniz.\(^3\)

\[ T^d = \text{Karadeniz}, T^{d'} = \text{Akdeniz}, n_{T^d} = n_{T^{d'}} = 1, \]
\[ L'_{\alpha} \equiv L'_{1,1} = \text{“black sea” (sic)}, \]
\[ L''_{\alpha} \equiv L''_{1,1} = \text{“white sea”}, \]
\[ A'' = \text{“the Mediterranean”}, \]
\[ \text{wf}(T^d) = \text{wf}(T^{d'}) = \text{compounding}. \]

Ex. 2: “Enter-tainment and exit-tainment” (as seen). \(^\square\) Ex. 3: Moscow’s “Red Square” inspired Tripoli’s “Green Square” after Kaddafi’s revolution.\(^4\)

Inverting the sense of ‘red’ and ‘green’: ‘red’ was to signal “move on”). “A and B are antonyms if everything that is A is not B and everything that is B is not A (in other words A and B are disjoint) and if everything that is A is more (less) \( \Diamond \) (size) on the appropriate scale) than everything that is B; but there are some things that are more (less) \( \Diamond \) than anything that is B that are not A” (Lehrer 1983); on grade of antonymy, see Lehrer (1982). Classes of opposition include, e.g., reversives (Cruse, 1979).

Colours are tricky. Ragone (1993), on the toponomastic history of the Carian coast (SW Anatolia), dubitably suggests (p. 885), for Kizil Burun (so called in the Pir Re’s portolan of 1521), identification with either Karaburun or Incegöl Burun. The Turkish for ‘cape’ is burun (also ’nose’); for ‘black’, karfu: but karfu means ‘reddish’.

See Ntuen and Gong (1997) on a computer simulation of human perception of colour—disregarding cultural or poetic factors. Yet, these are extremely important. Homer’s describing the colour of the sea (at Troy, thus, the Mediterranean in front of Turkey) by the colour of wine, was used as evidence of his blindness in the myth about him. Foam is white perhaps, but wine? Alan Kaye (1986) proposed a South Semitic etymology of ‘coffee’, claiming that the central sememe was ‘dark’ (“dark brew”), and that in medieval Yemenite Sufi circles, the name was transferred from wine to coffee, a “surrogate for wine”, which looked like it due to its “dark” color” (p. 557).

\(^3\)For example, ‘red’ \( \prec \) “\( \succ \)” ‘green’ in domains “traffic-lights” and “physical optics”, but not in “politics”. (Reportedly, Mao’s cultural revolution, by domain transposition, advocated

\(^4\)So it’s type \( \alpha \). But as you can name a square after whatever you wish, incongruence is not so striking.

The following is an example of a bird name used for a kind of traffic light device, prompting a more advanced device in the same category being named (this time, acronymically)
His Green Book is titled after Mao's Red Book. He is a realpolitiker in “A NAIPOLITIKER, the name of a software for induction (Nissan, 1986, p. 76). English blackout is a BROWNOUT, for a lesser disruption of power supply. English pit bull is a pit puppy. (N.B.: Not pit calf.) Derisively: one supposedly tough and threatening turns out to be inoffensive. English “Clockwork Kumquat” was the title of R.Z. Sheppard’s review of (Time, Feb. 14, 1972, p. 56) of an allegedly minor novel (One Hand Clapping) by Anthony Burgess, the author of A Clockwork Orange. If one bit is a bit, eight bits a byte, what’s four bits? Gone are the days when four bits made up half a dollar. Instead, the current standard of exchange puts four bits at half a byte, or one nybble. (Or is it nibble?)” (Corcoran, 1986).


Exhibit 11: Spanish de mal en peor (‘from bad to worse’) concurs with portmanteau-input Guatemalan into forming the jocular idioms de Guatemala en Guatapar, or in full: salir de Guatemala y caer en Guatapar. Tarquin Olivier suggested that bimbo should be replaced with the gendered birbantu and birbemelle. My three-year-old daughter was outraged at being unfairly blamed for her brother’s noisy games. “It’s not me being boisterous”, she complained furiously. “I’m girlish!”

Exhibit 12: Mock-placenames again: an anacoluth in the Babylonian Talmud (Tate犹, 152, a) relates that a scholar, R. Joshua ben [i.e., son of] Qorha, was insolently asked by a eunuch (gawza): “How far is it from here to Qarahna?”. Punch line: “As far as from here to Gavzania”. An actual town by the name Qarha did exist in Mesopotamia in the time of Isaiah.

In 1994: “Ann Richards […] is running for re-election as Governor of Texas against George W. Bush, a Republican and the eldest son of the former President. […] She derides him as “all hat and no cattle”. […] Her followers hand out bumper stickers saying: “Don’t elect the son-of-a-Bush”. They call him “Shrub”,” as reported by Ian Brodie in the London Times (Oct. 20, 1994, p. 15), under the title “Lone Star governor struggles to uplift the Shrubs”.


2. Eunuchopolis, or, to the Jastrow dictionary (1903), Eunuchos, versus Baldur. Select 8. The contrast, here, is between two physical defects, and between the degrees of severity of the attached social stigma. The provocateur’s plan-failure can be captured by Dyer’s (1985) thematic abstract units (TAs). “What is the difference between TA- vulnurable and TA-GREAT-HERM?” In TA- vulnurable, the planner has to correctly anticipate the potential reaction of his opponent to his counter-plan. In TA-GREAT-HERM, the planner has to take into account the negative side-effects of a [i.e., his own candidate] retaliatory plan, without regard for the opponent’s reactions” (p. 96). Dyer’s BORS would associate adages Don’t throw rocks if you live in a glass house and The pot calling the kettle black respectively with TA- vulnurable and (p. 31) TA-HYPOCRISY.

A sequel project, IRON-FINDER (Dyer et al., 1986, 1999) may provide a model for this.”
Incinerator inspired, as a punning portmanteau (not a misspelling) with 'sink', trademark IN-SINK-ERATOR for a kitchen in-sink shredder; even though 'incinerator' and 'shredder' are opposite hyponyms of 'disposer'.

In the terminology of imaging or printout orientation in computing, **seascape**, for the rotated image specular with respect to the more usual landscape, whose usual opposite is **portrait**.

**Cheeseburger**, backformed by replacing the non-etymological ham-in-hamburger (which actually is from Hamburg).

The punning proper name Qarnuna, to be interpreted, in Aramaic, as 'Cold [is the fish]', was formed by mock-allowing the actual personal name, Hammuna, into 'hot' + 'fish'.

**Hebrew** ḥozér bi-šēlāi, in polemic antithesis. Where a metaphor of being "born again" is standard in English for one adhering to some fundamentalist brand of one's [dominant] denomination of birth, a rough equivalent obtains in contemporary Jewish society, lexically reflected, in Jewish American slang, by "BT" (as a self-applied descriptor of reborn Jew) short for the traditional Hebrew idiom ba'al štive (lit. "one having [undergone] repentance")

or, in Israeli Hebrew, by ḥozér bi-štivū ("one who comes back in repentance"). To give visibility to the opposite trend of people turning secular, militant secular circles patterned after it—retaining 'returnee' and punning on the word for "repentance" also meaning 'answer'—the compound ḥozér bi-šēlāi ("one who comes back with a question"); or, by ancient semantics, "one going around seeking").

A pen name;** positivist** thinker Max Nordau coined **Nordau** (by double replacement) in contrast to his original family name, Südfeld.

The son of Gabriel Südfeld, a Hebrew-language writer, wrote not in his father's tongue, but in German; he moreover changed his name ingeniously: Südf, for south, became Nord, for north, whereas Feld, for 'field', became -au, i.e., a waterside meadow. This way, Meir Südfeld became Max Nordau. Later developments in his life [i.e., his embrace of Herzlism], "till the end, believe, as though, any intention that may have been hidden in that ingenious change, but that very change, and even more so the device employed, cannot but arouse a sad thought" (Sadak, 1989, p. 416). The sense of Nordau, "probably is 'land by the water in the north', most likely either the North Sea or Baltic coast" (K.M. Schmidt, p.c.). In agriculture, cultivated fields and pasture lands are opposites. The formula is adequate, as L₉ terms obtain through $L_{Q_0}$, defined as $l_0$ (left(T)), i.e., the, or one, literal sense of term T as formed, here, Nordau. If, instead, we insist on considering each word in each compound on its own, then getting $L_q$ through, say the path that resorts to term $T_q$ that in turn resorts to term $T_p$ would not do, because that path picks a substring from the entire T, and then assumes (by folk-playful etymology) a given literal sense. The formula as is contemplates just one substring being picked; it captures this example, but not the full extent of its aptness. Refinement would fix the paths, enabling each member of the compound to have its literal sense recognized, and the senses of both these members to be then recognized as being as semantic opposition to one another, the substrings in the other compound.

It takes α or β. Contrast the concrete sense of broth-erhois-à-vis a given individual, versus the general connotation (and nonliteral use) of brotherhood, which makes for incongruence somewhat redolent of misanthropy. A satiric Hebrew poem by Abraham Ibn Ezra (12th century) mocks a certain town: We' anš-t-hammamq'im 'heque-qyyn, / um ḥa'addam 'āder bo 'āqyn. Which I render as: "And the people of that place, the brothers are of Cain; / Which advantage has a man there? Any? Né, there ain't."

The analysis in Levin (1976, pp. 202–203) points out: "The expression 'the brothers of Cain' may be taken to mean 'murderers', like the ancient Cain, or then, instead, 'people of hêqel', who are like Cain's murdered brothers. Hêqel is Abel; it's a pun on hêqel, i.e., 'vapour' and also 'lack of substance', 'emptiness', 'something vain and silly'. Levin goes on: "The next verse is based on Ecclesiastes: umotâ-ha'addam mn hâbâhêmâm 'âqyn, ki hakklî hêqel ['and the advantage of man with respect to the beast, there is none, because everything is vanity']. Does the poet refer, with 'âdâmm ['a human', 'humankind', 'Adam'], to the townsfolk who are like beasts? Or, then, to himself, as even if he is the only human being in the town where he found himself, he had no advantage over the beastly beings inhabiting the place" (p. 203). There is ambivalence; Cain vs. Abel, with the pun revolving on the latter, is amenable to misanthropy in "the brothers of Cain", if we are to retain the reading that, instead of understanding 'murderers', maintains 'people of no substance'.

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16Prefix auto- ('self') got sense 'car' through a portmanteau (from automobile, to auto-anything else relating to cars (Italian autostrada), while English motorway). This process pattern accounts for the transition from Tetra Pak for a pyramidal container (tetra-as it's four-faced), to Tetra Brik from the same manufacturer, Tetra Pak (note also the omission of c from Pack and Brik). In a Tetra Brik, every face has four edges, but Tetra is there for the manufacturer.

17Exx. 15 and 17–18 take ḫ, while Exx. 16, 19 take α. Zero for 'is' is OK (as Semitic lacks the word), but word order is twisted, unless emphatic intonation is read in. The Babylonian Talmud (Tractate Kiddushin, 25, a) tells the story of some scholars from the Babylonian town of Nisnai, who failed to recognize the authority of a new rector of the nearby, well-known Academy of Sura. The rector then sent to them a faculty member, the prominent Hammuna. Sura, they claimed, was not on a par with them. Willing to test his own stature, they proposed a question to which he had the scruples not to reply (short of improvising). They jeered in gloat: "You are not Hammuna, but Qarnuna!" i.e., Prof. Hofish, my foot. Some Mr. Cold-fish you are". (Academia never really changes, does it?) Next, that passage discusses answers to their problem. Niznian gloss may have implied, as well, derivation of Qarnuna from the lexical root kārām for 'horn' (or 'corner'), as though: "a stupid beast, horns and all". Medieval commentator Rashii of Troyes interpreted it as 'idle' (cf. idiomatic 'sitting by the stovetop'), but related it to *Qarnuna* (to him, 'market'), as though: "one who has squandered time at the marketplace" and didn't study enough.

18Priscilla White is the original name of Cilla Black, of chat show fame. Her assumed surname is of type α.
fatherhood shaped Edison’s design choices” (Jenkins, 1987, p. 48). **Ex. 22:** A Hebrew coinage by Even-Oden formed as ‘Gomorranism’, as though.**22**

**Ex. 23:** Names for pairs of islands.**23** **Ex. 24:** In pre-state Israel, Hebrew Boaz for a landowner (eponymously, after the Biblical Ruth’s rich second husband), vs. α-mysantonymous Yakhin, the name of an agricultural company set up by the trade union (resenting the ‘Boazes’). Its name was patterned after the Yakhin Column opposite the Boaz Column in the Temple of Solomon (1 Kings 7:21, 2 Ch. 3:17). Alas, Yakhin was on the right, while Boaz was the left column, pace political metaphor. Like ‘Boaz’, ‘Yakhin’ is also a personal name in the Bible (Gen. 26:10, Exod. 6:15, Numbers 26:12; another person in Nehemiah 11:10, 1 Ch. 9:10, 24:17).**24**

**Ex. 25:** In Italy’s juvenile literature, the most popular hero from Emilio Salgari’s (1863–1911) exotic adventure novels is Sandokan, a Malay prince-pirate fighting colonialism. The 1970s yielded the TV serial Sandokan. Around 1980, one television show featured a sketch parodying that series; its main heroic was named Sandogati,**25** patterned after gatto (‘cat’) in contrast to cane (‘dog’)**26** **Ex. 26:**

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**22**In Hebrew medical terminology, Even-Oden’s posthumous dictionary (Even-Oden and Rotem, 1975) never set the standard or even got the favor of official language-planners, and rather reflects the inventiveness of a physician hooked on neologisms. One entry, with no claim of political correctness, proposed ‘amoraniut, i.e., ‘Gomorranism’, as though, to name ‘lesbianism’ (which, by the way, is also from a toponym). Place-name Gomorrah forms a pair with Sodom, but nothing specific can be gathered about its mores from Scripture. Thus, the name (that never stuck) is a sterling α-mysantonymy, by virtue of gratuitous association with the paired toponym.

**23**Daniel Potts, in his paper “Reflections on the history and archaeology of Bahrain” (1985), explains why the island of Manama, forming a pair with Bahrain, is identified with “mention[s] by Strabo, Pliny, and Ct. Ptolemy under the name Arada” (p. 704). “J.S. Buckingham, Travels in Assyria, Media, and Persia... London, 1929, p. 452, noted that the name of the Adar, or the smaller of the Bahrain islands, was ‘an allusion to a mythical island of great antiquity, where the island is said to have been’. This transposition of the two prominent seaports from the Phoenician homeland is only quite marginally related to mysantonymy, in the sense that modern scholarly perceptions looked for a toponymic pair to be completed.

Tah and Bohu name two islands in Rabelais’ Pantagruel, Book IV, Ch. XVII—Vol. 2, pp. 88-92 in edn. Jourda (Garnier, Paris, 1902); “Ce meme jour, passa Pantagruele et ses deux isles de l’Houu (sic) et Bouu, es (sic) que les fetes que frere” (i.e., “... where we found nothing to fry!”); followed by other pairs of islands: Nargues and Zargues, Telciinian and Geningiaian, Enig and Evig, the latter, to Jourda (fn. 9 on p. 92), alluding “to a treatise of Charles V with the landgrave of Hessen, in which a word replacement enabled the emperor to wrongfully imprison the landgrave”. (“The trick involved ohne einige Gefangnis, ‘with no imprisonment’, vs. ohne evige Gefangnis, ‘with no life imprisonment’."

**24** Select 7. The jingle tune was the same, only the wording now was a mock-heroic Sandogati, Sandogati, ha un coraggio che ‘ro da matt (‘... his courage is sheer madness’). The sketch appeared with Kabir Bedi, the actor who played Sandokan, appearing to chase away the impostor (boorish, diminutive Franco Franchi, beturban for the occasion).

For all of that TV parody being based on the Italian name “A memorable instance” of wordplay “is a pair of cartoons featuring Vikings and Viqueens” (Costes, 1991). **25** With co-hyponyms **Ex. 27:** In Italy, Donald Duck’s nephews, Huey, Louie, and Dewey, are Quo, Quo, Qua (after qua for ‘quick’). Ė... nignistica, established in 1990 (Intertime, Milan), featured a quiz column titled QUIZQUOQUAQUA. It’s a δ-mysantonymy: Qui is in quoz, and here all three of them are made to parade. **Ex. 28:** New York = the Big Apple < ‘p’ the Big Orange = Tel-Avim. **26** **Ex. 29-31:** American schools being instructed to no longer employ the terms ‘blackboard’ and ‘whiteboard’ because of possible racial associations, have been fingered as being a good illustration of the excesses of political correctness. Take α. The following two apocryphal anecdotes differ, in that they take gamma, and in that the prescription of an absurd substitute word (blame γ) is mockingly ascribed to a zealot of ideology such-and-such and, in particular, of its prescriptions on wording. The first one (apocryphal?) has somebody maintain that history must be replaced by herstory, in deference to feminism. A joke circulated in Italy after the Fascist regime prescribed the defunct term of address Let (literally, ‘She’ for ‘Madam’ or even for ‘Sir’) to be replaced by the extant voi (lit., ‘you’, pl., for sing., now obsolete. The joke has a teacher question a pupil, can[e] for a dog, being mistakenly detected inside Sandokan. Salgari himself in all likelihood did not think of a dog, as his literary intentions were heroic, not comic. Likewise, in Medieval Italy the Mongol emperor was called Il Gran Cairo, which just happened to homonymously also mean “the large dog”. It may be that a positive metaphor about emblematic dogs occurred in the first name of a well-known character from Medieval Italy: Can Grande della Scala, a ruler who, a protector of Dante and other authors, was unconcerned enough about his own name for him not to refrain, at a dinner, from the prank of having all bones and other refuse found under the table surreptitiously gathered and placed at Dante’s feet, whom he then went on to expose as a glutton, for everybody else to guff—away at Dante, not at the aptly named Can Grande.

The opposition pair could even be \( N_1, N_2 \) where \( N_2 \) are merely co-hyponyms; e.g., ‘panther’ vs. ‘tiger’. Of leftist satirist and journalist Kurt Tucholsky (1890–1935), who suicided in his Swedish exile to protest Nazism, Harry Zohn remarks (S. W. Judasica, Vol. 15, 1971): “From 1913 he was encouraged by Siegried Jacobsohn to write for his periodical Die Schaubuehne (later called the Weltbuehne), one of the most aggressive and effective magazines of its time. His articles appeared under various pseudonyms (e.g., Peter Faunter, and Theobald Tiger), often side by side”.

**27** In the English-language Jerusalem Post, whose Internet edition of May 5, 1998, featured an analysis article by Sarah Honig, titled “A nasty week in the Big Orange”, on its mayor’s relations with both major national parties having turned sour. Arguably, the Big Apple for New York (the non-capital metropolis of the United States) is in the same relation to the Big Orange for Tel Aviv (the non-capital metropolis of the Israel), as the role of apples (and the John Appleseed myth) in folkloric perceptions of the making of America is to the role of oranges in the lore about the making of Israel. Or, then, ‘apple’ is the unmarked fruit, perhaps prototypical for the kind ‘fruit’ (cf. culture-bound Western identifications of Adam and Eve’s prohibited fruit), whereas ‘orange’ is a marked choice which is particularly apt in association with Israel’s traditional agricultural produce.

2Niculescu (1974) is on Italian pronouns of address.
who provides the correct answer: "Galileo Galilei". The indignant teacher insults the pupil ("Asino") and corrects him: "Galileo Galviov!".  

**Ex. 32:**  
'Black and white' (as opposed to 'colour') is *noir et blanc* (in that standard order, contrary to standard Italian *bianco e nero*). In the Collection Polars Noirs (in African or Black studies and lore) of Parisian publisher L'Harmattan, a title, *Quand les flamboyants fleurissent les Blancs dépérissent*, lends itself to an obvious anti-White reading, with a half-serious effect when the proposition is quoted in the title (≠ fully endorsed). The entry in the catalog proceeds to list the illustrator and the author of the texts ("Dessin Sallia et texte Bréal-Karul") and these publication data: "Noir et blanc, BD, t. 1 . . . . . 60 F". No colour illustrations. It makes for a pun. Had the idiomatic word order been different in French, it would have called for punning order inversion, itself faintly redolent of α-misantonymy. But alas, French idiomatics already lists the two colours in the context desirably orderable, 'black' and then 'white' (Ex. 33).

**Ex. 33:** At a time of dire inflation in Israel, a government decree freezing prices was issued in early November of 1984; yet, during the following few days, a price hike occurred. A newspaper headline, *Zo haspa‘á Zo ritáh!* ("This, a freezing? It's boiling!", lit., by symmetry, also a noun: 'a boiling [up]') summarized (by way of a prelude) the angry remarks of a shopper at a supermarket: "What freezing? Where is the freezing? We got a boiling [up] of prices, not a freezing!" (report by E. Tavor and S. Hen, *Yedioth Ahronoth*, 9 Nov. 1984; Sat. suppl., pp. 1–2). My point here is that if we tend to consider the metaphor of prices 'boiling [up]' as being an apt one, then our misantonymy formula (here, with α) does not apply.  

**Ex. 34:** *Nightmare < "be" Day-mare (< "Doris Day")*.  

On Bialik's poetry, Sadan (1989) discusses the two senses of Hebrew and Yiddish terms for 'dwarf(s)'. One sense is 'elves' (dwarfish night-spirits, typified, *inter alia*, by Bialik's poem title *gammadei-lagil*, *i.e.*, lit., "night-dwarfs"). Instead, in his ballad "The Dead in the Desert" (of 1905/5), Bialik refers to dwarfs walking upon the decomposing corpses of giants, and, Sadan observes, here dwarfs are meant as everyday, human dwarfs (actually, as a moral metaphor for lowly people). In Sadan's own words (p. 221), these are not Yiddish *Schreitelech*, which translates "dwarves of the night", but instead (Sadan's coinage) *gammadei-yôm*, *i.e.*, lit., "day-dwarfs". Tentatively, misantonymy does not apply.  

True, one whose body or spirit is dwarfish persists so round the clock (so, why "day-dwarfs"?), but one can nevertheless find an explanatory path stating that, in the context of Sadan's discussion, elves' nature rules out their ever appearing by day, so the only dwarfs you "may" ever meet by day are those meant as in the other sense(s), human dwarfs, either physically or morally such.  

**Ex. 36:** Asked by a publisher...

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29 My own present mental association is not a merry one, as I vividly recall, from many years ago, standing in front of a blackboard and announcing: "Let us put it black on white". Which prompted yells of mock-outrage from an unfortunately minded student, protesting because I was putting the Black upon the White: intended as ethnic domination, not to re-mark on my chalk being white, unlike dark ink. What matters here, is that the device of inverting the order of the colours in the idiom, based on the sense of the colour-terms as referring to skin colour and the respective group identity, is also an example of misantonymic formation. Instead of involving the replacement of a substring with a string carrying the opposite sense (or, anyway, in contrast), here it's the order between the same substrings that is inverted.

30 As seen, even the (crisp) negation operator in the formula could be replaced by allowing graded truth values, or opposition other than binary. One kind of situation where we could usefully consider this, is when (as in the price hike anecdote) a conventional, lexicalized metaphor is flanked, in the same textual context, by a free metaphor (one formed for the occasion).

31 A British reporter flew to California to interview singer and actress Doris Day, aka Calamity Jane. Negotiations failed. The report (Iley 1994), titled "Oh dear, what a calamity. (Stuff the agent. Doris Day told CHRISSY ILEY more than enough about herself by refusing to see her)", concluded: "The interview was off. The telephone was down and my Day-mare with Doris was over". It's γ-misantonymy.

32 It would take α, if it did. Note that β would apply if we were willing to extend folk-etymology, or reinterpretation, to include the (alternative) reconstruction of why the concept "night" is resorted to, to form the compound.

33 On this contrast of 'day' and 'night' in a pair of nominal compounds, consider a particular locus in Rashi’s 11th-century Hebrew commentary to the Pentateuch; namely, his discussion of the verse: discussing the verse "Aaron told Moses: Today they [two of Aaron’s sons] had presented a sacrifice for unintentional sin, […]", and such things have befallen me: [they died]; should I have eaten out of the sacrifice for unintentional sin today? Would this be deemed fit […]?" (Leviticus 10:11), i.e., "I did not, it would have been improper if I did". Rashi’s gloss singled out the word *hayyôm* ("today", literally: "the day"). Rashi saw there the opportunity to distinguish between two technical senses of the word *'onån* ('bereaved', 'ritually de-fled by bereavement') by means of a day/night contrast. The mention of ‘day’ in the verse is taken to be one of the qualifying traits of Aaron's status as “bereaved”—a status which used to temporarily disqualify lay priests (but not the high priest, which Aaron was) from certain ritual functions. Rashi observes: "One’s status as a 'night-bereaved' does not disqualify [for the purposes concerned], as the 'bereaved' ('onån') status only applies on the day of burial [of the high priest's kin][a]). It is a status taken to perdure until sunset, by Pentateuchal Law: that this status perdures also during the following night, has been mandated by Rabbinic Law. The different source of authority (Rabbinic培训班 that go beyond Pentateuchal bounds have a lesser status for some purposes), entails certain facilitations for the "night-bereaved" status, as opposed to the Pentateuch-mandated "[daytime] bereaved" status. In particular, the meat of the Paschal lamb, as long as the Temple was standing (up to 70 C.E.), could lawfully be eaten (according to a rule in the Mishnah, Tractate Pesahim, Ch. 8, §8), by a person to whom that status was applying, as by the evening the "nightly bereaved" status would be the kind in effect. Rashi’s technical consideration, as quoted above, is to the effect that Aaron (the first high priest ever), in refraining from eating from the sacrificial meat, could have been believed to have refrain from eating it because of his "bereaved" status (barring him from consuming sacrificial meat), but that this was not the reason, and that anyway that reason would not have been valid, because it applies just to a priest who is a "daytime bereaved". This example clearly sounds way out, yet it instantiates a general principle of economy in the formation of lexical compounds. In both Sadan’s case (concerning the wording of Bialik’s poem on a fabled theme), and the case
how his plays were doing, Sir James M. Barrie, the author of Peter Pan, reportedly answered: "Some Peter out, some pan out" (Barrie, 1967). The playful phrasal verb to Peter out is a γ-misanonymy.

\[
T_1^a = \text{Peter out, } T_1^p = \text{pan out, } S_1^p = \text{pan, }
\]

\[
L_{1,1} = \text{"to turn out well", }
L_{1,1} = L_{3,1,1,1} = \text{"whatever Pan stands for inside the name Peter Pan".}
\]

**Ex. 37:** I'm making up this item: "So and So didn't make it into the Gotha, the Aristocracy in his domain, but he comfortably settled for the B-ristocracy." The latter is clearly a misanonymy; it transparently denotes such a second class that for all of its being second best, nevertheless participates in the prestige of those prominent. **Ex. 38:** San Remo, the town on the Ligurian Riviera, was actually named after St Romulus (in turn, bearing the name of the founder of Rome, as well as of the last emperor, Romulus Augustulus), but because of phonetic reasons, misidentification obtained. There is no misanonymy, yet there is some affinity,48 because of an unwarranted replacement with the opposing pole in a pair in contrast: the original Remus was the twin brother of the original Romulus, who killed him when he challenged his authority.49 **Ex. 39:** In

of Rashī's legally coloured hermeneutic making appeal to the technical terminology of a pragmatic niche from the ritual of priesthood from ancient antiquity (at the time of its being instituted, with Aaron, and at the time of its demise as captured in the Mishnaic codification)—the contrast in terms of day and night is used as an economic distinguishing trait (by compounding) between the two senses of a lexical entry. Out of a complex context, the compounding process just draws the elementary name ("day" or "night") for a trait they share as with opposing values, such as indeed, in these two examples, temporal reference in terms of day and night. However, in Rashī's example, the idiomatic and literal senses are perhaps closer to each other, than in Sadan's case, because the temporal attribute is very relevant in the definition of both of the ritualistic concepts, 'nightly bereaved' and 'daytime bereaved', whereas when Sadan refers to "ordinary", "everyday", physical or moral dwarfs as 'daytime dwarfs', he is doing so without daytime being a definitional feature of the concept, but just in opposition to the extant compound 'nightly dwarfs', which is Bialik's idiomatic way of referring to elves (Hebrew, or, at least, the sublanguage instantiated in Bialik's classicistic writings, did not use to have a specific term for this concept). As to elves—as they are a particular kind of night spirits—the temporal trait is quite an important trait indeed (or should I say, definitional, not just assertional feature) of this particular lexical concept, 'nightly dwarfs', in the contrast of 'nightly dwarfs' versus 'daytime dwarfs'.

48The type being γ for the town, but β for the person, as San is mandatory in the town name, being optional instead in references to a saint.

49Still different is the case of a rare feminine form of a common masculine first name, when tampering with an idiom. Henrietta, now not the commonest of names, replaces Harry in a fixed trio, as Sham Sangha (1997) discusses job opportunities and "the lure of the city" for information technologists in London: "we are increasingly finding a number of first-time contractors with very bitty experience who want to work in the Square Mile. However this is NOT a market for any Tom, Dick or Henrietta who fancies him or herself as a city slicker"

the bilingual table of contents of a particular collection of poems in Hebrew (Nissan, 1999b), the Hebrew and English titles of the poems (and other sub-divisions of the volume) appear on opposite sides of the same line; titling often involves wordplay. They anyway draw heavily upon the mutual complementarity of the titles in both titles appearing side by side. The entry whose Hebrew title is pättiś ve-sadān (lit.: 'hammer and anvil') has the English title Anwilsonian Institution, which suggests deformation from 'Smithsonian Institution'. 36 **Ex. 40:** In 1990, Italian reporter Oriana Fallaci published (with Rizzoli, Milan) her book Incisionia, titled after an Arabic exclamation for 'hopefully'. Cartoonist Forattini then published a cartoon with the word insciaqua, obtained by isolating the Italian adverb of place là ('there') at the end of the Arabic word, then replacing it with qua ('here'). The word in the cartoon also suggests the verb sciaquà[r] ("to rinse"). 37 **Ex. 41:** An old story from Topolino (the Italian edition of Mickey Mouse magazine) had Donald Duck try to free a fishing reserve from a voracious pike; to that effect, he introduced there a pescecagnotto, literally, 'thugfish', where 'thug' can be considered a peculiar diminutive of Italian cane for dog. Indeed, the fish was depicted with a bulldog head and the body of a fish. It proved effective against the pike, but alas, it also eventually attacked the cat of Daisy Duck, with dire consequences to Donald. The nominal compound pescecagnotto is conspicuously a portmanteau of cagnotto ('thug') and pescane ('shark'), which in turn is a compound, literally 'dog-fish'. In this case, the portmanteau formation arguably plays on a contrast within a universe where cane and cagnotto are in contrast (the visually hybrid dog-fish couldn't be


36The replacement (through γ) is of 'anvil' for 'Smith', which in turn is a widespread, even token English last name. (An intermediate stage is the relation 'smith'-'tool', which in turn instantiates the general relation 'agent-'tool'.) This takes on the function of a cue: read the word sadān for 'anvil' as a last name. The invitation is to analogize: by applying the rule of three, 'smith' is to 'Smith' as 'anvil' is to... 'Anvil'? Who on earth got such a last name? As the context is bilingual, and the poem itself is in Hebrew, it's in the Hebrew onomastic repertoire you have to look. And indeed, the text itself includes intertextual links to the prose of the late Dov Sadan, who was the founder of a paradigm in literary studies in Israel. Surely enough, it's a cryptic cue. Should an educated reader be unable to solve the riddle, s/he will be aware of there being a riddle anyway.

37It's γ-misanonymy, like the following, again a theophoric formation. Along with Sperandio, an Italian personal name—from Spera in D-o for "Hope in G-d"—there used to be the feminine first name Speranda. Here we have a clash of word-formation rules. Apparently, the prevailing one was the popular perception that you can have a noun (or an adjective) made into one that is in the feminine, by just having it end by -a. What is awkward is that the sense according to the compounding also appears to change, as though dea ('goddess') was involved (as though, "Hope in [some] goddess").
Pesce cane, because the latter was already "taken", denoting as it does the sense of 'shark'. Arguably there is a mild degree of misanonymy, if we admit that we can define a convenient universe where the contrast takes place. Example 42: In the countryside of northern Italy, "Red menace" was documented as jocularly naming crows, 'red' being a substitute for 'black'.

Example 43: In the jargon of cinematography, *prequel* was coined in contrast to *sequel*. This is no regular instance of prefixation. The derivation of the neologism is as a portmanteau (i.e., a blend), by replacing the prefix *pre-* for the substring *se-*; actually part of the Latin lexical root of *sequel*. Yet, the γ-modification made is transparent: you are supposed to know what the sense of *sequel* is, and the sense of the prefix *pre-* is obviously in contrast. For all of the neologism having been patterned irregularly, the semantics of the modification made is aptly descriptive, and transparent from the literal sense.39

3 Coinage in Response, Other Than Misanonymously

Puns in response, and coinages in response—where the word-formation device is patterned after word-formation as instantiated in an extant term with which the new term forms a binary contrast—are not necessarily misanonymy.40 Only if there is something clearly unwarranted in the makeup of the new coinage, it is legitimate to ascribe misanonymy to it.41

Example 44: The character watching the news on TV (as a broadcaster is seen reading from his notes on screen)—in the Dry Bones cartoon published by The Jerusalem Post on Monday, June 2, 1997—makes the following remark (empha-

38In a dialectal form arguably from Romagna, a region that witnessed the fierce struggle of Marxian (emblematically, 'Red') and Fascist death squads (the Black Shirts). I found *mmaccia* for 'crow' (for standard Italian *mmaccia*, i.e., 'threat': either as it feeds on the crop, or superstitiously) in an old book of Oddi's *Ornitolgia Italiana*. It gives lists of dialectal names for birds (that one is listed as "Northern"). The entry for 'crow' also lists variants: *ammaccia rosa* ("the Red thread") arguably responds to *ammaccia nera* ("the black thread"); by slyly or cunningly intended misanonymy. Either it subverted the colour reference of *ammaccia nera* to avoid the political reference to Fascism, while at the same time calling attention to it (because 'red' and 'black' are only opposites in politics), or then this replacement of red for black was actually performed at an earlier period, when landowners and the like would provide the completion for 'threat' with what at the time they used to consider the worst threat (i.e., as though: never mind the birds in the field, what is threatening is in the heads of the hands working in the field). However one reconstructs the way the compound developed, the basic fact is that the colour was replaced.

39POSTGRES and SEQUEL were the names given to the successor database management system and successor query language of INGRES and QUEL: "The INGRES relational database management system (DBMS) was implemented during 1975–1977 at the University of California. Since 1978 various prototype extensions have been made to support distributed databases [...], ordered relations [...], abstract data types [...], and QUEL as a data type [...]. Consequently, we are building a new database system, called POSTGRES (POST infrared)" (Stonebraker and Rowe, 1986, p. 340); and then (ibid., p. 342): "This section describes the query language supported by POSTGRES [...]. The query language is based on the INGRES query language QUEL [...]. Several extensions and changes have been made to QUEL so the new language is called POSTGRES to distinguish it from the original language and other QUEL extensions".

40Contrastive titling: The main title (patterned after 'the body politic') of Richard M. Blau's book of 1979, from the catalogue of Rodopi (Amsterdam): *The Body Impolitic: A Reading of Four Novels by Herman Melville*. Sometimes book titles respond to each other.

41Punning in response: Italian puns on *Ottomani* interpret it as "eight hands", and make the Ottomans skin to either centipede, or quadrirrimi (lit. "four-handed", i.e., 'monkeys'). It's an old slur. The Carnival of 1642 in Genoa saw the premiere of a tragicomedy in prose, in the Genoan dialect, by the ruler's son. Edited by Trovato (1993), its Ottoman setting is the target of puns. So the commedia dell'arte's character Graziano (p. 264): *Soliman consta de sol i man, l'in buona aritmetica l'e al numero un, tal che Soliman vuol dir sol una man, i.e., 'Soliman' is 'sol I man', [he's got] only one hand*. Clearly a pun in response to the 'hand' pun on *Ottomani*, the pun on *Soliman* is, however, autonomously descriptive.

Let us make up a special β-misanonym to prove the need to extend A' to include this possibility as well:

\[ \forall \zeta \left( \land \neg (L'_{\zeta} \leftrightarrow \text{contrary}(L''_{\zeta})) \right) \]

That is, the incongruity of the literal sense could even affect T' instead of T'', because a cunningly alternative [folk-etymology] of T' (thus, with ζ standing for β) motivates a punning coinage, T''41, which in contrast is aptly descriptive. Our T' and T'' will be peculiar names for Venice and Aleppo, respectively. Venice used to be the maritime power of the eastern Mediterranean, for all of some trade patterns taking an overland route, too; still in the 18th century, from the non-Mediterranean Near East (Baghdad and beyond) the primary route to Venice was through Aleppo (not just merchandise: even Greek manuscripts were sent on occasion to Aleppo for them to reach them, again overland by caravan through the Balkans, specialised printers in Venice before Leibniz inherited the lead in that domain).

The Arab world knew Venice by an Arabic name, al-Bunduqiyya, its Greek etymon (*Bundukhi*, 'maritime, cf. *Pontic*') being justified by both her urban reality in the lagoon, and her maritime power. Yet, Arabic *Bunduqiyya* also means 'rifle', perhaps because (a folk-etymology?) bullets from the musketry of old could be metaphorised as *bundqa*, 'hazelnuts'. The latter's co-hyponym, 'pistachios' (the unmarked, i.e., default-, sense of *justaq* has a lexicalized association with Aleppo, through the usual compound *fustaq Hulabi* (also used in Israeli Hebrew speech), versus the marked *fustaq Bonday* for 'peanuts' (a name from the Gulf trade with India). Now, an epithet for Aleppo can be conceivably coined: al-Fustaqiyya (a congruent T''), while quipping: "You couldn't get to the Bunduqiyya (Venice), without going first through P assaults", ending by the neologised epithet that thus
sis in the original). PANEL 1: “First there was Aristide, who was...going to bring democracy to Haiti.” PANEL 2: “Then they told us that Kabila was...going to bring democracy to Zaire.” PANEL 3: “Now they say that the new guy in Teheran is...going to bring democracy to Iran.” PANEL 4: “Hollywood invented the happy ending but it took TV news to come up with the “happy beginning.” Even though the compound happy beginning, in double quotes in the cartoon, is formed by contrast, this is not quite an instance of misanonymy, because the literal sense almost matches the intended idiomatic sense.

Example 45: In Israel, the leading financial newspaper is Globus. In 1994, a competitor, Telegraph, conducted an aggressive marketing campaign. Initially, ads (e.g., on the radio) used to stress the telegraphic concision and relevance of the material published. Then, in June, roadside billboards featured this slogan: Al tebarbër GLOBÁLT / dabër TELEGRÁFIT. (“Don’t ramble on globally. Talk telegraphically”). The two adverbs were each printed in a style and colour emulating the heading of the newspaper whose name it resembles. A positive message is conveyed concerning Telegraph, along with a negative message concerning Globus. ■ Ex. 46: Describing a street in Naples, Renato Fucini, who was writing in 1876 (1976, p. 16; quoted by Carazzì, 1981: Vol. 2, p. 472, note 4) remarked that the newspaper-boys were unremittingly shouting: ‘o Pi, ‘o Pun. These were backclipped names for two local newspapers: Il Piccolo (“The Small”) and Il Pungolo (“The Goat/Prick/Spur”). The first syllable in both names is stressed, and it starts by the same consonant, the first syllable in both names is stressed. The backclip ‘o Pi is euphonic, in Neapolitan; in contrast, ‘o Pun is perhaps less motivated, other than by imitatively applying the device of backclipping the triggers, for Venice, the cunning reinterpretation ‘Hazelnutown’, incongruent and thus misanonymous.

The Times Magazine of January 14, 1995 4(2) published (p. 4) a hostile caricature of Boris Yeltsin remarkably laden with elements from a standard anti-Russian repertoire. The layout is like a poster announcing an opera (“Now touring in Chechenia”, invaded at that time). The Russian president was depicted as an ancient czar (perhaps reminiscing of Ivan the Terrible). In his right hand, he holds a missile (instead of a sceptre), while in his left hand, the imperial orb is replaced with a bomb with a lit fuse. Above, in a Roman script vaguely imitating Cyrillic, this inscription: KREMILIN OPERA presents / BORIS / NOTGOODENOUGH (with a gratuitous “plus full supporting pogrom”) — a pun on Mussorgsky’s opera Boris Godunov. While strongly redolent of misanonymy, this coinage is not incongruent, as it literally conveys an apt description of the concept depicted. It’s a mere response to the opera title. Yet, it suggests a reinterpretation of the latter (“Goodenough”), thus arguably it’s amenable to the device of a name for Venice taken to mean ‘Hazelnutown’ in response to the neologised ‘Pistachiotown’.

In coinage in response, the shared device (the modification with respect to the base of derivation) may consist, for example, of similar suffixation, or, instead, just changing the stress and/or adopting (and making specific for the new senses) existing dialectal forms for both terms, in a way that conspicuously reflects the model after which the new term is patterned. The term is not necessarily new to the lexicon, but in may be a novel lexical selection within a conversation. Ex. 47: A friend in Israel was once commenting about the two major parties: [This one is trefya, and [the other one is nseyla]. Ex. 48: As the director of a dental surgery in Israel left his office and imperiously called out, to a subordinate: 1ZOLDA! (i.e. ‘Isult’, in Hebrew and Russian), the following, rather gratuitous remark occurred on my mind (in Italian): Che tristanzulato. (i.e., “What a despicable person.”). Ex. 49: Without there being misanonymy (because the semantics is accurately descriptive), yet heavily resorting to coinage in response, mischievously devious “bending” of names also occurs in the following anecdote. One work

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42 Ma’arav is the Hebrew name for a Western—an film about the Old Wild West. Its formation instantiates a pervasive suffix, -an, as applied to ma’arav (“west”). Were we to coin (from mizrah: for “east”) mizrahim for an Eastern or Levantine film on local colour (be it an Egyptian or Indian film, or a film on kung-fu from Hong Kong), it would just be coinage in response within an opposition pair; as to discriminativeness, the etymological semantics would be fairly accurate, unlike in misanonymy.

43 “Non-kosher” either describes the status of meat, or figuratively ascribes a negative moral quality: something fishy or worse. (In the latter sense, strictly non-kosher in English—not a descriptor from dietary laws—is patterned after strictly kosher, which is indeed a category in catering). Non-kosher meat may be trefya ([meat from] an otherwise kosher animal that was improperly slaughtered or was found to have an invalidating defect upon inspection, literally: ‘defouled’, ‘(killed by an animal of) prey’), or nseyla (‘carrier’, [meat from] an animal that has died naturally). The standard Israeli form of those two words as in their primary, ritual sense is trefi and nesli, whereas trefya and nseyla are (Yiddish, Hebrew English, and) Hebrew in Ashkenazic traditional pronunciation. If used in Hebrew by a speaker who does not otherwise exhibits or affects the latter, it’s a cue that sense must be taken to be metaphorical. This especially applies to the usually selected trefya. As to nseyla, it’s available to accompany the former.

44 The characters known in English as either Tristan and Isult, or Tristram and Isolde, in Italian are called Tristano and Isotta. The noun tristanzulato (certainly not the disparaging diminutive of Tristano, which it could nevertheless be on merely morphological grounds) is related, instead, to the adjective tristo (i.e., ‘bad’, ‘wicked’, ‘mean’, or, as a noun, ‘rogue’), as in un tristo individuo (i.e., ‘a despicable person’). It is not a derivative of the adjective tristo (i.e., ‘sad’), which to many an Italian must be a rather apt association of ideas with Tristano, given the tragic outcome of the Tristan and Isult story (whereas in English, Tryst instead would possibly be associated). Actually, tristanzulato has two acceptations: ‘dejected-looking’ and ‘ill-disposed’; disambiguation is according to the context of the situation described.

45 The departure is from the standard form of Isotta and

References


then, by punning, from a standard collocation. Generations of Italian writers (and just of Italians writing) were influenced by the florid style, lexically archaizing yet innovative, of D’Annunzio, the flamboyant Italian poet, novelist, and dark genius of nationalism. (Zollino (1998) has shown how deeply indebted to him, although deeply resentful of him and his rhetoric, was Carlo Emilio Gadda, the wildest neologist of 20th-century Italian literature.) In a still liberal society, however, D’Annunzio had reason to watch his vulnerability to irony. The anecdote has him feeling the hurt.

46*Gutta* is Latin; *uro* is from Latin *aurum*. The arbitrary *Isotta* coined by D’Annunzio subserves the syllable count, and was evocative of such first names as *Isabella*, *Isa*, and German *Iiselotte*, as well as, perhaps, the Byzantine dynastonym, the isaurians: another character of D’Annunzio is Basillia Paleada, the avenging princess in the gruesome play *La Nave*, set in Venice in Byzantine antiquity.

47A prosaic concept, as contrasted with D’Annunzio’s precious pretentiousness. *Pomodoro* for ‘tomato’ is *pomodor o* or *pomodoro* in the plural, and, “wrongly” so, *pomodori*. By parodistically emulating the deformation instantiated in the sound-akin *Isotta*, the critic derived *Risatoto* from *risotto*. Note that *riso otto* means (though by a non-standard syntax, or, rather, with the numeral placed as in a shopping list) “eight bursts of laughter”. Indeed, *riso* is the collective plural for *riso* (i.e., “laughter”), whereas *risate* is the singulative plural: “countable bursts of laughter”. The idiomatic *Facciamoci quattro risate* means, in standard Italian, “Let’s have four bursts of laughter”, which can be interpreted as “Let’s have some fun [at X’s expenses]”. It would be marginally acceptable usage, perhaps, to say *due risate* (“two bursts of laughter”). Here, instead, the bursts of laughter are eight, the double of the four as in the idiom. This way, the message of the title *Risatoto al pomidoro* was: “D’Annunzio’s latest work is matter for laughter and deserves tomatoes”. D’Annunzio could not forgive this. The sublime and the ridiculous are very close neighbours indeed.


Metaphors in Comprehension and Reasoning Processes - An Analysis
Based on the Discussion of the European Monetary Union in Italian
and Portuguese Newspaper Articles

Andrea Faulstich
University of Potsdam
Department of Romance Languages/Applied Linguistics
D-14415 Potsdam
andrea.faulstich@t-online.de

Abstract

On the basis of empirical findings in Italian and Portuguese press articles about the European Monetary Union the paper tries to account for cognitive implications metaphors in this particular context appear to entail. Proceeding from cognitive approaches stating that metaphorical projection is generally conditioned by the physical and cultural surroundings to which language users are exposed, it is additionally argued that the skill of producing and perceiving figurative speech can be seen as a universal cognitive facility, whereas the concrete realization and meaning of metaphorical utterances are influenced by semantic traditions and cultural aspects codified in the respective languages. Metaphors are therefore regarded as highly language-specific expressions. The examples from Italian and Portuguese reported in this paper are intended to reveal that a comparison of metaphors within one language as well as across language boundaries requires an investigation based on culture-independent concepts.

1 Introduction

The increasing internationalization of business-based transactions implies the intensification of transnational cooperation as well as an extended interest in facts about economic interrelations throughout the population of every country concerned with the effects of global commerce. The introduction of the European single currency can be seen as a consequence of close multinational business relations. For languages like Italian and Portuguese, the advancing globalization creates conditions that entail two contrary tendencies of development (Eichinger, 1997) which, as they seem to depend on functional differences or on modifications related to various ranges of use within the specific language of economics, do not exclude each other.

On the one hand, in scientific, professional and administrative contexts the speakers of the two languages in question tend to assume elements of a lingua franca, mainly Anglicisms, or, for special communicative purposes such as the interaction between experts, they are inclined to adopt the respective common idiom as a whole. In these circumstances, local linguistic realities are of secondary importance and linguistic variety is regarded as an obstacle of interaction on international stages.

On the other hand, in communicative settings, where information transfer normally takes place between Italian or Portuguese native speakers respectively, and which are typically accessible to non-specialist recipients such as contributions of the press, the two languages appear to betray, to some extent, a tendency to individualization, and to reveal characteristics related to local surroundings, cultural values and to historical developments of the two countries involved.

Long before the beginning of the European Monetary Union information and controversial debates about the single currency were being widely disseminated by the media. Metaphors, although also present in the specific language of economics, seem to assume a particular place in imparting knowledge about this event.

The objective of the study consists in describing the cognitive implications metaphorical expressions carry in the popularization of abstract processes such as the European Monetary Union through Italian and Portuguese press articles, usually directed to a large and heterogeneous circle of addressees, affiliated, however, to the same native language. In order to explicate the underlying theoretical and practical entailments of the single currency to a great number of readers, journalists have to transform the technical language of economics into a more concrete language, familiar to the average readers and understandable on the basis of their knowledge and experience.
Taking into account the actual status of Italian and Portuguese within the European Union, which differs to a large extent from their official status and can be described as less important if at least not leading, there are reasons to suppose that the language of the Italian and Portuguese press treating the argument in question may give clues to the respective cultures, which, though part of a common Mediterranean and European background, are shaped by the history of each of the two countries, compensating for the general linguistic equalization all over Europe which favours languages such as English and French.

Basically, it is argued that metaphorical language not only conveys information and concretizes notional knowledge, but also reflects specific perspectives of a determinate language community, attached to a distinct system of values and traditions, and that it may therefore manifest the way different aspects of the Monetary Union are perceived by exponents of the Italian and Portuguese culture.

In this paper I will discuss two approaches to metaphor which seem to be compatible with each other and at the same time proficient in explaining the interrelations between metaphorical speech and cognition. Proceeding from the assumption of holistic cognitive linguistics that metaphorical projection is conditioned by the particular surroundings to which speakers are exposed, it is argued that metaphorical expressions in Italian and Portuguese newspaper articles about the single currency may give insight into the underlying cognitive structures shaped by the respective physical and cultural environment.

In addition, considering the fact that metaphor as a linguistic technique is manifest in the development of many languages so far described, there are reasons to suppose that the ability to produce and apprehend metaphorical utterances is a sort of universal cognitive property whose actual accomplishment, however, in utilizing the particular encyclopedic knowledge of a distinct culture, may differ from language to language. As metaphors do convey not only speakers' experiences related to a determined period of time, but also semantic traditions associated with the history of a culture and reflected in the evolution of language and meaning, it is claimed that metaphors are highly language-specific, containing clues to the culture in which they are produced and applied. Proceeding from a cross-cultural approach proposed by Wierzbicka (1992), I will outline the epistemic relevance of a semantic metalinguage in contrastive metaphor research and sketch some examples that may illustrate the need for a culture-independent view.

2 Cognitive Approaches to Metaphor
2.1 Theoretical Implications

As many linguistic theories of metaphor are based on the Aristotelian ideas considering figurative utterances as a means of embellishment in poetic and literary writing or as an instrument of rhetorical speech which, in any case, can be reduced to or substituted with literal terms, cognitive theories are generally deemed to be appropriate for the analysis of metaphors as phenomena of the everyday language accounting furthermore for the role of extralinguistic knowledge in the constitution of metaphorical meaning.

In the following I will recall some implications cognitive theories carry, restricting myself to the approaches proposed by Lakoff and Johnson (1980) who obviously can be considered to be among the most salient representatives in this field of research.

Lakoff and Johnson (1980) demonstrate that in American English highly conventionalized metaphors often make use of one and the same metaphorical concept and that such expressions seem to be automatically understood and applied. These findings make them conclude that metaphorical speech is not a mere linguistic phenomenon but that it is also strongly related to human thought and must be regarded as an instance of cognition. According to Lakoff and Johnson, metaphor is a technique that helps human beings structure their perceptions of the world and that supports them in grasping abstract facts by means and in terms of concrete experience (Lakoff/Johnson, 1980: 5). Hence, as metaphorical projection is based on extralinguistic knowledge, the meaning of figurative expressions cannot be built up on pure linguistic items, but is likewise constituted by encyclopedic notions of a certain culture.

Lakoff and Johnson (1980) propose a metaphor typology based on the different kinds of experience that motivate metaphorical conceptualizations. In the following section I will briefly describe this classification and apply it to recurring metaphorical concepts in Italian and Portuguese press articles about the Monetary Union, attempting to outline the fields of experience that are transferred into the abstract domain of the single currency and giving hints to the presumable functions of the individual utterances. In addition, I will delineate some problems coming up with the classification submitted by Lakoff and Johnson (1980).
2.2. A Metaphor Typology Based on the Assumptions of Cognitive Science

The metaphor typology proposed by Lakoff and Johnson (1980) essentially reflects distinctive sorts of experiences that enable a person to apprehend and structure abstract and vague ideas.

The first group in this classification is constituted by orientation metaphors, whose motivation can be explained by the fundamental experience of need for spatial orientation. In their effort of finding their way through the world, human beings structure physical surroundings in pairs of semantic opposition such as up/down, before/behind, over/under etc., respectively related to locally fixed points. By means of metaphorical projection, the experience of spatial orientation is transferred into abstract domains (Lakoff/Johnson, 1980: 14). Metaphorical concepts such as more is up and less is down accordingly transmit human experiences of vertical shift into the area of more or less abstract quantifications. The following examples taken from Italian and Portuguese press articles treating the single currency may illustrate the way orientational metaphors function:

INCREASE IS AN UPWARD MOVEMENT
(1) Ma, ... sono scappate in avanti le Borse, con rialzi-record a Milano, Parigi e Francoforte (tutte salite di quasi 6 per cento). (La Repubblica, 5 gennaio 1999)

(2) Na Europa, o sentimento generalizado foi de euforia, com Frankfurt e Paris, as principais praças da zona euro, a registarem subidas surpreendentes a cinco por cento. (Público, 5 Janeiro 1999)

DECREASE IS A DOWNWARD MOVEMENT
(3) Piazza Affari ha perso l'1,76% ma tutti i mercati europei vanno giù. Euro in affanno (La Repubblica, 9 febbraio 1999)

(4) Ontem, os bancos centrais dos Onze avançaram com uma acção concertada de descida das taxas de juro para trés por cento. (Público, 4 Dezembro 1998)

The examples show that various economic processes such as the growth of the gross national product and the fluctuation of exchange rates quoted in the market can be interpreted as conceptualizations of simple orientational experiences.

Besides, the development or state of qualitative figures can also be expressed in terms of vertical shifts often accompanied by the attribution of valuations producing concepts such as happy is up and sad is down, also evident in the examples (2) and (3) where the feelings of euphoria (euforia) and worry (affanno) are indirectly related to respectively increasing and decreasing exchange rates. For further examples concerning different realizations of orientational metaphors see Lakoff/Johnson, 1980: 14-21.

The function that can be ascribed to conceptualizations of spatial experiences in the context of economics mainly consists in the explanation of changes and processes that are invisible and can only be gathered from abstract figures. Some of the orientational metaphors become more or less fixed terms, especially in the jargon of the Stock Exchange such as the notions of the French hausse/baisse, which find correspondent lexicalizations as e.g., rialzo/ribasso in Italian (see example (1)) and alta/baixa in Portuguese.

A second assembly of metaphors is composed of expressions whose metaphoricity is based on the projection of knowledge about concrete objects and substances into vague and unstructured spheres. Utterances of this kind are called ontological metaphors (Lakoff/Johnson, 1980: 25). The following examples taken from the same corpus shall epitomize the presumed underlying technique:

ABSTRACT CONCEPTS ARE THINGS
(5) Già ieri... si è potuto toccare con mano che l'euro si è trasformato in una specie di calamita, di polo di attrazione per i capitali vaganti in giro per il mondo. (La Repubblica, 5 gennaio 1999)

(6) Dos três balcões visitados, o do Banco Nacional de... é onde o euro é mais visível. O banco tem à disposição dos clientes um folheto com explicações detalhadas sobre a moeda única... (Público, 5 Janeiro 1999)

These examples reveal that by means of metaphorical projection ontological domains are ascribed characteristics usually regarded as belonging to material objects or substances.

The most overt ontological metaphors, as stated by Lakoff and Johnson (1980: 33) are personifications, where material or non-material objects and ideas are specified by human features. The following examples give insight into the mechanism of personification, typical in the economic context, where, due to the evolution of computerized commerce, the physical contact between persons engaged in trade becomes more and more exceptional and transactions lacking in visible „agents”, turn out to be increasingly less transparent.

CAPITAL RESOURCES/ CURRENCIES ARE HUMAN BEINGS
(7) Il segnale forte che arriva oggi dai mercati è proprio questo: i capitali non temono più le aziende e le Borse del Vecchio Continente, ma,
A highly recurring metaphorical concept which is part of the ontological group is the so-called container metaphor, which conceptualizes a great number of notional areas as an interior room with more or less plain boundaries towards the external sphere (Lakoff & Johnson, 1980: 29). There are several metaphors which seem to display that the European single currency is comprehended as such an interior space, leaving other currencies and the respective countries outside. The examples may give evidence to what is asserted:

**THE SINGLE CURRENCY IS AN INTERIOR SPACE**

(9) Nella notte tra il 2 e il 3 maggio 1998 è nata Eurolandia, la regione europea che dal primo gennaio 1999 adorerà la moneta unica. Essa è costituita da 11 Paesi che soddisfano le condizioni poste dal Trattato di Maastricht ... la Grecia resterà fuori, perché non in regola con i principali criteri, mentre altri tre, Gran Bretagna, Danimarca e Svezia, hanno deciso di non far parte del primo gruppo. (Il Sole 24 Ore online, Guida all’euro, 1998)

(10) Temos hoje taxas de juro iguais às alemãs: onde seria isso possível, mesmo com as nossas boas políticas, fora do euro? ... E a nossa voz ... só se reforça por sermos fundadores do clube euro 11. (Público, 5 Janeiro 1999)

The general task accomplished by ontological metaphors is certainly the concretization and animation of abstract objects and theoretical constructions in order to make them accessible to our cognitive system, prestructured by material experiences. Some expressions based on ontological conceptualizations can also be seen as part of the special terminology of economics whose metaphoricity, to a large extent, is presumed to be no longer realized by most of its users. Examples of such terms are *moneta* in Italian and *moeda* in Portuguese which roughly both mean ‘coin’ understood as a metal stamped money issued by a respective authority, and ‘currency’ in the sense of money generally used in a country as a medium of exchange. The concepts of *moneta* and *moeda* will be the subject of further discussion in section 3.2.

A third group of expressions described by Lakoff and Johnson (1980: 61-68) consists of metaphors based on the projection of a determinate, well structured experiential area into an indefinite, unstructured notional domain. These forms of complex conceptualization are called structural metaphors. The concept **ARGUMENT IS WAR** evidenced by Lakoff and Johnson (1980: 4) is part of this set of metaphors. As for the special context of the European Monetary Union, there are reasons to suppose that the project of the single currency is conceptualized as a kind of military operation or as an alliance of defence against the overwhelming power of the American currency or against general dangers deriving from potential crises of global markets. Some examples may illustrate this type of metaphorical projection:

**THE MONETARY UNION IS AN ALLIANCE OF DEFENCE**

(11) Un continente da sempre diviso in decine di stati e in decine di monete (spesso in guerra fra di loro, con risse e svalutazioni continue), si è presentato per la prima volta al mondo dietro lo scudo di una moneta unica, per di più protetta da regole così rigide che ne fanno una sorta di super-marco del Terzo Millennio. (La Repubblica, 5 gennaio 1999)

(12) ... e que o facto de fazer parte dessa zona dá a economia portuguesa uma enorme salvaguarda em relação à volatilidade dos mercados internacionais e, nomeadamente, dos mercados financeiros e permite-nos ter uma política monetária e cambial que sozinhas nunca poderíamos ter e que sustenta muito mais facilmente o nosso desenvolvimento. (Público, 31 Dezembro 1998)

Other structural metaphors, partly conventionalized in everyday language and therefore used and understood automatically, also recur in the context of the single currency as e.g., **EURO IS A BUILDING, THE EUROPEAN MONETARY UNION IS A REVOLUTION, THE EUROPEAN SINGLE CURRENCY IS AN ANIMATING BEING, THE INTRODUCTION OF THE SINGLE CURRENCY IS A BIG BANG, COMPETITION IS WAR, THE WORLD IS A THEATRE, MARKETS ARE STAGES etc.** There are some metaphors based on the structural conceptualization of the Monetary Union as an adventure, often related to the sea. This concept will also be the subject of analysis in section 3.2.

**THE EUROPEAN MONETARY UNION IS AN ADVENTURE**

(13) Sono queste le Colonne d’Ercole attraverso le quali il sistema bancario italiano deve passare prima di affrontare la navigazione nel mare aperto dell’Unione monetaria. (Il Sole 24 Ore, 6 Ottobre 1997, Speciale Euro)

(14) Reconhecendo que a moeda única envolve riscos, lembra que sem eles também não existem vantagens. ... Tudo o que vale a pena tem riscos na vida. Se houvesse medo do risco de ‘mar teñebroso’, se não se tivesse corrido um risco calculado, não teríamos feito os Desobrimentos. (Público, 5 Janeiro 1999)

Among the three types of metaphorical speaking, structural metaphors deliver the most elaborate pattern to
impose on their target domain. Of course, the conceptualization of abstract fields such as economics by means of distinct, well-known scenarios provide important epistemic clues to understanding and reasoning processes. Structural concepts, however, are very likely to conceal certain aspects of reality, focusing on those that are most compatible with the structure of origin. Lakoff and Johnson (1980: 10-13) describe this phenomenon as highlighting and hiding effects.

The typology proposed by Lakoff and Johnson (1980) indubitably has a considerable heuristic value and does not lack plausibility. Yet, some problems arise with the classification, as well as with other assumptions on which the theory is based as a whole. As for the categorization of metaphors, it has to be stated that the localization of metaphorical utterances within one of the somehow preestablished classes can be influenced, to a more or less noticeable extent, by the interpretations of the one who carries out the investigation. In some cases it is quite difficult to distinguish unequivocally between metaphorical concepts and to obtain clear, unbiased classifications, that would be independent from the decisions the researcher is forced to make. More important with regard to the objective of comparative studies of meaning is the fact that metaphorical concepts are implicitly supposed to be cognitive universals. Although Lakoff and Johnson (1980: 14) admit that metaphors are based on physical experience that can differ from culture to culture, no hint is given that would demonstrate how to account for these differences. Instead, it is presupposed that recurring metaphorical concepts are language-independent instances of cognition. Besides, Lakoff and Johnson do not explicitly consider diachronical shifts of meaning inherent in metaphorical utterances. Despite a certain first sight evidence for similar or even identical concepts utilized in describing facts related to economics in general and to the particular context of the Monetary Union, there are reasons to assume, that metaphors are highly culture-specific. In order to analyze and compare rigorously the cultural values reflected by metaphorical specking produced in different languages it is necessary to reduce as far as possible the bias of a culture-specific perspective.

In the section that follows I will briefly sketch the theses advanced by Anna Wierzbicka, trying to outline the epistemic relevance of a semantic metalanguage as an instrument of contrastive description of meaning, compatible with the assumptions of cognitive semantics and appropriate to enhance the typology proposed by Lakoff and Johnson.

3 A Cross-Cultural Approach to Metaphor

3.1 Theoretical Implications

The essential idea submitted by Wierzbicka consists of the conviction that it is impossible for a human being to carry out any investigation from a completely extra-cultural perspective (Wierzbicka, 1992: 25-27). Human thought is directed by principles and beliefs that do not need to be shared by all human beings. Yet, according to Wierzbicka, this does not imply that a description of other cultures inevitably has to be accomplished from the viewpoint of our own culture applying the categories preestablished by the language we use.

As a basic hypothesis Wierzbicka (1992: 21) claims that each language is composed of a limited number of elementary concepts existing in all other languages, and of an unequally greater amount of complex concepts that can be described as culture-specific combinations of the basic set. Elementary semantic universals are deemed to be the appropriate components of a culture-independent metalanguage by means of which comparative studies of meaning should be carried out (Wierzbicka, 1992: 16).

These assumptions seem to be a pertinent access to the semantic analysis of metaphors within one language as well as for comparisons across language boundaries. As metaphors, according to different theories, can be regarded as expressions, whose figurative meaning is due to the projection of semantic features from a domain of origin into a target domain (Bühler, 1934; Black, 1979) it appears to be clear that such utterances are mainly complex and that their meaning usually can be explained with reference to the two spheres that interact. These presuppositions lead to the conclusion that metaphors, except for such expressions whose metaphoricity cannot be reconstructed by etymological evidence, normally should be no candidates for the set of semantic universals. At the same time this makes plain that metaphors are necessarily culture-specific combinations of elementary semantic universals.

For a contrastive analysis of metaphors in Italian and Portuguese, a language-unspecific approach seems even more important, since one is concerned with two languages that are genetically and culturally comparatively closely related. In order to account systematically for different realizations of metaphorical speech related to the Monetary Union in Italian and Portuguese, it seems useful to describe the various concepts with regard to encyclopedic traditions codified in each of the two languages. In the following section I will sketch a first approach to such a comparative analysis.
3.2 Metaphors as Culture-Specific Configurations of Semantic Universals - Examples Related to the Context of the European Monetary Union

As already mentioned in section 2.2, the expressions moneta in Italian and moeda in Portuguese, being parts of the respective expressions moneta unica and moeda única, can be seen as ontological metaphors whose metathoricity presumably is not realized by the speakers. Although the two terms in question at first sight seem to be equivalent, it may be interesting to work out even slight differences of meaning, that could display the respective comprehension of facts and processes related to the notions of coins, money and currency.

According to the definitions offered by the dictionaries Lo Zingarelli. Vocabolario della lingua italiana (1995) and the Novo Dicionário Aurélio da Língua Portuguesa (1986), the terms moneta and moeda share the following semantic features:

1. round metal piece used for exchange
2. means of payment/legal tender
3. general medium of exchange
4. means of value measurement
5. means of credit
6. means of preserving value.

Besides the facets reported above, however, there are in Italian some figurative expressions based on moneta which, related to the value and authenticity of the coin as such, have a pejorative meaning, denominating, e.g., low moral standards in terms of money:

fare moneta falsa per q.c.: essere disposto anche ad azioni disoneste pur di riuscire nel proprio intento pagare q.c. di mala moneta: ripagare con ingratitude
moneta senza conio: inganni, imposture (Lo Zingarelli, 1995).

These conceptualizations associated with the validity and trustworthiness of coins as legal tender by way of their alloy, may refer to Roman history, especially to early forms of inflation, caused by a qualitative deterioration of the metal money. The high correlation between the concepts of money in its material form and the personal integrity of those who, in terms of governmental authority, administer and distribute it, as it is codified in Italian, still seems to be present in the notion of moneta and has perhaps been renewed on the occasion of the "tangentopoli" affair in the early nineties of this century. In this connection it is worth mentioning that the Italian conio, etymological correspondent of the English coin, in the present stratum is related to the act of coinage, whereas conio in the sense of fraud or deception, common, e.g., at the time of Dante's Divine Comedy, is no longer used today.

Within the press articles about the European Monetary Union the concept of moneta unica is mainly embedded in semantic fields with positive connotations, emphasizing the economic growth and stability supposedly promoted by the new currency. Of course, it would be reasonable to argue that, in this special context, the aspect of moneta as a metal coin is not relevant, whereas the abstract meaning of currency prevails. On the other hand, there is, in Italian, the term valuta referring much more precisely to what the English currency designates, emphasizing the aspects of money as a national currency and as an abstract and negotiable means of exchange (Lo Zingarelli, 1995). It will be interesting to look into the further semantic development of moneta that, conditioned, of course, by the future evolvement of the single currency, perhaps will produce metaphors revealing a modified notion.

In Portuguese, besides the semantic features indicated above, moeda can be used in a figurative sense, denoting anything to which can be ascribed a certain value (Novo Dicionário Aurélio, 1986). It seems moreover that moeda and thus the concept of money or currency is not associated with negative aspects such as inflation or corruption. Although Portugal, too, in different epochs of the past, was confronted with degradation, judgements related to that facet of currency are not reflected in the present language stratum and therefore, presumably, do not enter into the notion of moeda única.

It is furthermore worth mentioning that the Portuguese language apparently has no word comparable with the Italian valuta. Moeda must account for both aspects and is thus perhaps more neutral than moneta. Another reason for the coexistence of the polysemic moneta and the relatively unequivocal valuta may perhaps be seen in the history of banking, closely connected with the prosperous commerce in Northern Italy, especially in Venice and Florence, promoting from the 12th century on the development of institutions which can be regarded as predecessors of modern banks (Weimer, 1994) and which soon induced to a theoretical occupation with the rules of bookkeeping, recommending the use of precise terms. In fact, the first treatise on accountancy is considered to be Luca Pacioli's summa di arithmetica (1494), a basic work that favoured the dematerialization of commercial exchange.

Besides, both languages dispose of the term divisa, deriving from the French devise and carrying the more ancient meaning of "insignia". It seems interesting to note that divisa in Italian appears as a separate lemma which explicates its relatively precise meaning as a me-
diom of payment in a foreign currency (Lo Zingarelli, 1995), whereas in Portuguese the meaning of divisas is defined as a means of payment that enables a person resident in a certain country to acquire goods from a person resident in another country (Novo Dicionário Aurélio, 1986). Furthermore, the Portuguese divisas in the sense cited above is not registered as a distinct lemma, but put among other definitions, one of which corresponds to "insignia", presumably referable to the different emblems distinguishing various types of coins. It is extremely hypothetical to draw, from the mere lexicographic evidence, any conclusion concerning underlying cognitive structures. It can only be assumed that in Italian the relation of divisas with the ancient meaning "insignia" might be less noticed than in Portuguese and that the higher frequency of use in the special context of exchange might have favoured its registration as a distinct lemma.

With regard to the theoretical ideas submitted above it is evident that the metaphors moneta unica and moeda única are culture-specific. The different facets of meaning of moneta and moeda due to historical developments of the individual languages, potentially affect the comprehension of the new currency, metaphorically conceptualized as THE EUROPEAN SINGLE CURRENCY IS A MONETA UNICA/A MOEDA ÚNICA. Yet, further research will be necessary to detect the culture-independent elements that constitute the two concepts in question in order to explicate and compare them, e.g., with the English single currency and the German Einheitswährung.

Another example already cited concerns the conceptualization of the European currency as a kind of adventure, with references to seafaring in both languages. These relations first of all can be explained by the respective geographical location within the Mediterranean Sea on the one hand, and towards the open Atlantic on the other. The experiences of the two cultures linked with the sea, nevertheless, are obviously different. The Portuguese are famous for their overseas discoveries and the early maritime trade in the 15th and 16th century, connected with the increasing knowledge of shipbuilding, navigation, naval warfare, cartography etc. gained from their expeditions. Italian seafaring is often associated with the naval traditions of the Republic of Venice as well as with the sea battles reported in Roman history.

It is interesting to note that the conceptualization of the European Monetary Union as a seafaring adventure seems to reflect, to some extent, the different historical experiences. In the Portuguese culture, especially in literature, the epoch of naval expeditions has left obvious traces, certainly epitomized in the poem Os Lusíadas of Luis de Camões (1572), which still today seem to be present in Portuguese language and thought. I recall example (14) quoted in section 2.2 that appears to be a plain allusion to the verses of Fernando Pessoa from his poem Mar Português (1934):

Ó mar salgado, quanto do teu sal
São lágrimas de Portugal!
Valeu a pena? Tudo vale a pena
Se a alma não é pequena.
Quem quer passar além do Bojador
Tem que passar além da dor.
Deus ao mar o perigo e o abismo deu,
Mas nele é que espelhau o céu.

The risks of death characteristic of seafaring are transferred into the domain of monetary and economic dangers that might come about with the single currency. Yet, the perils that have to be undertaken are justified by the potential benefits that may derive from audacious adventures and by the general recognition that nothing precious can be obtained without suffering. In Portuguese culture the sea is the central medium through which glory and prosperity can be gained. The act of embarkation is a matter of course, a challenge that undoubtedly must be accepted.

In example (13) the Monetary Union is conceptualized as the open sea where the members of the single currency have to prove that they provide the skills of safe navigation. The difference in the Italian notion of the sea with regard to the Portuguese concept can further be clarified by comparing the respective semantic features of the Italian mare and the Portuguese mar. Both terms, according to the definitions offered by the dictionaries Lo Zingarelli (1995) and the Novo Dicionário Aurélio (1986), share the following facets:

1. mass of salty water covering the globe
2. great extension
3. big quantity.

In Italian there are figurative expressions related to the feature of great extension or quantity, mainly connected with a mass of unpleasant things or states of mind as e.g., mare di guai, versare un mare di lacrime or the proverbial phrase L'acqua va nel mare which expresses that the water of the sea has no washing quality (Lo Zingarelli, 1995). In Portuguese, mar additionally can have the meaning of moral abyss. Moreover, mar aberto is defined as a wide portion of the sea without the casual appearance of geographic obstacles that could impede navigation (Novo Dicionário Aurélio, 1986). Hence, it seems obvious that the concept of open sea in Portuguese is connoted positively with the openness as a characteristic that favours the scopes of seafaring, i.e., achieving objectives whose qualities are still vague, bearing, however, unexpected or unimaginable values. In Italian, on the other hand, the term mare aperto
appears within the lemma *aperto*, merely illustrating the meaning of the past participle (*Lo Zingarelli*, 1995).

These observations appear to be compatible with some comments on Portuguese mentality advanced by Schexmann (1993: 104-110) stating that, compared with central European cultures, the Portuguese have a strong belief in the impossible, even in miracles, refuting at the same time meticulous accounts for facts.

The examples reported above may give a short insight into the culture-specificity of metaphors related to the European Monetary Union. Most differences appear to be due to historical events codified in Italian and Portuguese and are still manifest in expressions that demarcate facts concerned with the economic change taking place within Europe.

4. Conclusions

The discussion advanced so far should have made clear that the metaphorical conceptualizations in Italian and Portuguese, related to the European single currency, obviously are language-specific. Referring to an identical extralinguistic reality, the propositions resulting implicitly from metaphorical projections (*THE EUROPEAN SINGLE CURRENCY IS...*) differ by virtue of the culture-specificity of the respective predicative components (*coin*, *adventure* etc.). These terms too, as well as certainly the metaphor as a whole, generally seem to be complex and not elementary, reflecting the cultural traditions that gave shape to the present lexica of Italian and Portuguese. Hence, it appears reasonable to begin comparative analyses from typologies offered by cognitive approaches to metaphor and work out what is asserted about the common extralinguistic referent, focusing subsequently on translating the predicative components into simple, less language-specific concepts.

The research carried out to this point is still far from providing a semantic metalanguage. Yet, the empirical findings reported above reveal that it might be important to be increasingly aware of culture-specific differences codified in conventionalized metaphorical speaking, enhancing the reciprocal appreciation in a multicultural and multilingual area like Europe. A thorough consciousness of cultural variety seems even more relevant since Italian and Portuguese have little significance as working languages within the institutions of the European Union thus precluding them, to some extent, from metaphorical conventionalizations that, on the official stage, take place in other languages.

References


The Continuum of Metaphor Processing

Matthew S. McGlone
Lafayette College
mcglonem@lafayette.edu

Heather Bortfeld
Brown University
heather_bortfeld@brown.edu

Abstract

We describe the explanatory value of a relativistic account of metaphor processing, in which different modes of metaphor interpretation are assumed to be operative in different discourse contexts. Employing the cognitive psychological notion of a “processing set,” we explain why people might favor attributional interpretations of figurative expressions in some circumstances, relational interpretations in others, and conceptual-metaphorical interpretations in still others. Applying this logic to findings in the psycholinguistic literature on metaphor suggests that some of the competing models may in fact describe different points on a continuum of metaphor processing.

In his classic essay “When is Art?”, Nelson Goodman (1978) argued that philosophical efforts to describe the attributes unique to art objects (i.e., what is art) might be misguided. Instead, he argued that the term “art” does not describe a class of objects that is intrinsically different from other object classes, but rather the product of interpreting an object in a particular way under particular circumstances. Our goal in this paper is to point out the explanatory value of this benign form of philosophical relativism in developing a comprehensive cognitive theory of metaphor understanding. Just as the aesthetic status of an object can vary from context to context, so too can the meaning of a metaphor. A comprehensive theory of metaphor must be able to account for the fact that metaphors can be and often are interpreted in fundamentally different ways in different circumstances. Although some theorists have acknowledged that context plays a significant role in the time course of metaphor interpretation (e.g., Ortony, Schallert, Reynolds, and Antos, 1980; Gibbs, 1980), there have been few if any attempts to explore its role in the manner with which metaphors are interpreted and ultimately the products of the interpretation process. We will argue that investigative efforts of this sort are not only warranted on empirical grounds, but also offer the added benefit of resolving longstanding disputes among various metaphor theorists.

The “Process Invariance” Assumption

Research on metaphor in cognitive science has typically focused on the conceptual processes underlying metaphor comprehension. Two general classes of process models have emerged from this research. Attributional models (e.g., Glucksberg, McGlone, & Manfredi, 1997) characterize metaphor comprehension (e.g., Our love has been a rollercoaster ride) as a search for properties (e.g., exciting, scary, full of ups and downs, etc.) of the vehicle concept (rollercoaster ride) that can plausibly be attributed to the topic (our love). In contrast, “domain-mapping” models (e.g., Gentner & Clement, 1988) characterize metaphors as conveying a common relational structure between the topic and vehicle concepts (e.g., the lovers correspond to travellers, their relationship corresponds to the rollercoaster car, their excitement corresponds to the speed of the car, etc.). Noting that certain domain-mappings underlie a variety of conventional figurative expressions (e.g., the mappings between “love” and “journeys”), some theorists have posited the existence of conventional “conceptual metaphors” that provide the conceptual basis for our understanding of the vast majority of metaphorical expressions (Lakoff, 1987; Gibbs, 1995).

Not surprisingly, there has been much debate among theorists about which model offers the most parsimonious and/or veridical account of how people comprehend metaphors in text and conversation (Bortfeld, 1997; Gibbs, 1992; Glucksberg, Keysar, & McGlone, 1992; McGlone, 1996; see also Murphy, 1997). The disputes over theoretical differences stem in part from a tacit assumption of “process invariance” common to both classes of models. This assumption holds that metaphor comprehension derives from a single conceptual process (whether it be attribution or domain-mapping) that is consistently applied by all interpreters in all contexts in which metaphors are encountered. This pervasive assumption has not been challenged because the vast majority of empirical studies on metaphor comprehension have relied on indirect comprehension measures (e.g., the time it takes readers to comprehend metaphors), rather than examination of the products of comprehension (i.e., people’s written and/or oral interpretations of metaphor meaning).

The handful of empirical studies that have focused on the products of metaphor comprehension have found considerable interpretive variability as a function of interpreter characteristics (age, knowledge state, and interpretive goal), contextual characteristics (whether the metaphor is presented in isolation or ongoing discourse), and statement characteristics (whether the metaphor is conventional or novel, relatively apt or inapt, etc.; Blasko & Connine, 1993; Gentner & Clement, 1988; McGlone, 1996; Tourangeau & Rips, 1992). The fact that people’s interpretations of a given metaphor may vary does not necessarily indicate that they are products of different interpretation processes. For example, the difference between interpreting Matt is a pig as meaning “Matt is gluttonous” or “Matt is slovenly” might reflect nothing more than the differential salience of pigs’ stereotypical properties in different contexts. In
this case, it is plausible that the different interpretations are derived by choosing differentially salient pig properties via the same property selection process. However, other cases of interpretive variability suggest that people can use qualitatively different kinds of vehicle information to characterize the topic. For example, consider the different ways one might interpret a lifetime is a day (McGloin, 1996). A day is a relatively short span of time, and consequently one might interpret the statement as an assertion that life is short. Alternatively, one might recognize a day as comprised of stages that thematically correspond to periods in life, and thereby interpret the statement as an assertion that dawn corresponds to birth, morning to childhood, noon to middle age, and so on. Like the interpretations of Matt is a pig discussed above, the former interpretation involves using a stereotypical property of the vehicle concept “day” to characterize the topic “lifetime.” Such an interpretation is predicted by attributional models – i.e., the vehicle is understood as being emblematic of a category of “short time spans” that can plausibly contain the topic (Glucksberg, McGloin, & Manfredi, 1997). In contrast, the latter interpretation involves using a system of relations in the vehicle to characterize the topic. This rich, analogical interpretation is predicted by domain-mapping models – people search for epistemic correspondences between entities in the topic and vehicle conceptual domains (e.g., Lakoff, 1987). Both interpretations are plausible and one cannot be deemed more apt than the other without the benefit of contextual support. However, the assumption that metaphor interpretation derives from a single conceptual process prevents both the attributive categorization and domain-mapping models from accounting for alternative interpretations.

Attributional vs. Relational Metaphors

Metaphors such as A lifetime is a day occupy an intermediate position in a similarity space between what Gentner and Clement (1988) referred to as “attributational metaphors” and “relational metaphors” (see Figure 1). Attributional metaphors such as Matt is a pig highlight the common attributes (e.g., “gluttonous,” “slovenly,” “untidy,” etc.) of topic and vehicle concepts that do not have obvious relational similarities. In contrast, relational metaphors such as Memory is a sponge convey common relational structures (e.g., information is to memory as water is to a sponge) in topic and vehicle concepts that do not have obvious attributional similarities. In-between attributional and relational metaphors are those like A lifetime is a day, which can be interpreted in terms of common topic-vehicle attributes (e.g., short time span) or relational structure (e.g., birth-dawn, childhood-morning, etc.).

Proponents of attributional and domain-mapping models of metaphor have differentially sampled metaphors from the semantic similarity space upon which to focus their theoretic efforts. Glucksberg and his colleagues formulated their attributional model primarily to describe how people interpret metaphors in conversation (Glucksberg & Keysar, 1990; Glucksberg & McGloin, in press; McGloin, 1996). Because of the time constraints imposed by the obligation to participate in an ongoing conversational exchange, conventional metaphors tend to be fairly simple and attributional in nature – e.g., My job is a jail. My ex-wife’s lawyer is a shark, etc. In contrast, Gentner and her colleagues account for metaphors in a domain-mapping framework that was originally formulated to explain scientific analogies. Such analogies (e.g., an atom is like the solar system) are almost purely relational in nature, and most of the example metaphors (e.g., A cigarette is a time bomb) used to illustrate the domain-mapping model are from the relational portion of the similarity space. In a similar vein, Lakoff and his colleagues have focused primarily on clusters of idiomatic expressions that imply epistemic relations between domains (e.g., blow your stack, get hot under the collar, and do a slow burn) all imply conceptual relations between the domains of anger and heated fluid under pressure), while ignoring idiomatic expressions whose metaphoric underpinnings appear to exist in isolation (e.g., get down to brass tacks).

This selective sampling of examples from the diverse corpus of metaphorical expressions explains in part why metaphor theorists have tacitly embraced the “process invariance” assumption. Within the limited set of metaphorical expressions that attributional and domain-mapping theorists have chosen to focus on, such an assumption is unnecessary. It is theoretically plausible that attributional metaphors are understood via a single conceptual process and relational metaphors are understood via a single, albeit different conceptual process. There is no pressing theoretical need to question “process invariance” unless one tries to account for the interpretation of attributional and relational metaphors within the same model. In this respect, the variability with which people interpret “hybrid” metaphors such as a lifetime is a day suggests that the labels “attributational” and “relational” are not exclusively descriptive of metaphor classes, but also of different modes of metaphor processing. In some circumstances, people may interpret the metaphor in attributional mode (“life
is short") while in others they interpret it in relational mode ("dawn - birth, morning - childhood, etc.").

**Metaphor Processing Sets?**

The notion of an interpretational mode or "processing set" has a long history in psychological studies of language comprehension (Bobrow and Bell, 1973; Carey, Mehler, & Bever, 1970; Garrett, 1970; Marshall, 1965; MacKay, 1970). For example, Carey et al. (1970) demonstrated that establishing a set to interpret particular syntactic structures can bias the way people interpret literally ambiguous sentences. They presented a literally ambiguous sentence following several unambiguous sentences which had the same grammatical structure as one of the meanings of the ambiguous sentence. Subjects modally perceived the meaning of the ambiguous sentence in terms of the set structure. For example, when sentences such as They are unearthing diamonds and They are installing benches preceded the ambiguous sentence They are visiting sailors, subjects modally interpreted "visiting" in the last sentence as a progressive transitive verb. However, when this sentence was preceded by They are incoming signals and They are emerging nations, "visiting" was modally interpreted as a gerundive adjective (see also MacKay, 1970).

Similarly, it has been shown that presenting people with supplemental semantic information can induce a processing set that can bias people’s interpretations of polysemous words. In a dichotic listening paradigm, Garrett (1970) presented ambiguous sentences such as The fans were noisy that night to the attended ear while simultaneously presenting unambiguous sentences such as Baseball spectators were yelling to the unattended ear. She found that people tended to understand the ambiguous sentence in a manner consistent with the unambiguous prime — in this case, people were more likely to interpret "fans" as referring to people rather than mechanical devices.

Bobrow and Bell (1973) invoked the notion of a processing set to describe the way people interpret idiomatic expressions. They reasoned that our comprehension of idioms such as let the cat out of the bag proceeds as if the idiomatic phrase were effectively a "long word." Processing the phrase as a long word differs from that for literal phrases, wherein each word is perceived, its meanings retrieved from semantic memory, and then each meaning is mapped into a representation of the phrase’s overall meaning (Quillian, 1968). To empirically investigate the dichotomy of literal and idiomatic modes of processing phrases, Bobrow and Bell presented people with sets of 5 sentences, the fifth of which included a phrase which could be interpreted literally or idiomatically — e.g., John gave Mary the slip. In the "literal set" condition, the preceding 4 sentences were sentences that could be interpreted only literally, such as Alan fed biscuits to his dog. In the "idiomatic set" condition, the preceding sentences all contained idioms, such as Henry was in hot water. Consistent with previous demonstrations of processing set effects, people were more likely to recognize the literal meaning of John gave Mary the slip (i.e., John gave an undergarment to Mary) first when it was preceded by literal sentences, but were more likely to recognize its idiomatic meaning first (John evaded Mary’s pursuit) when it was preceded by idiomatic sentences. Bobrow and Bell interpreted this finding as evidence that people are inclined to interpret idioms as "long words" when this processing mode is induced by prior context. Although there are intrinsic problems with conceiving idioms as merely "long words" (see McGlove, Glucksberg, & Cacciari, 1994), the notion of distinct literal and idiomatic processing modes has nonetheless been supported by many contemporary studies of idiom comprehension (Gibbs, 1980; Cacciari & Tabossi, 1988; Swinney & Cutler, 1979).

For our purposes, the notion of different processing sets may be used to account for a significant portion of the observed variability in metaphor interpretation: Qualitatively different interpretations may be the product of different metaphor processing sets. By this logic, the attributional and domain-mapping models can be viewed not as competing comprehensive models of metaphor interpretation, but rather as descriptions of distinctive processing sets that are activated in different interpretational contexts. The models’ status as distinct processing accounts has not heretofore been acknowledged because researchers have chosen to focus on metaphors from the extreme ends of the attributional-relational similarity continuum. Thus, attributional and relational interpretations are likely to be preferred for metaphors that are predominantly (if not exclusively) attributional (e.g., Clouds are marshmallows) or relational (e.g., Sarcasm is a veil) in nature. The "processing set" account is most clearly evident when one examines people’s interpretations of metaphors that afford both attributional and relational interpretations, and manipulates the contexts in which these hybrid metaphors appear.

As a preliminary test of the "processing set" account of metaphor interpretation, we developed a variation of the set paradigm used by Bobrow and Bell (1973). Twenty four Lafayette College undergraduates generated written interpretations of "target" hybrid metaphors after interpreting a block of "context" metaphors constructed to induce an attributional or relational processing set. To induce an attributional set, participants interpreted a series of 4 predominantly attributional metaphors prior to interpreting the target; analogously, a relational processing set was induced when participants interpreted a series of predominantly relational metaphors prior to the target. An example set of context and target metaphor materials are presented in Table 1. For any given target metaphor, participants saw only one set of the context sentences (attributional or relational). The metaphors used to construct these materials were drawn from sets used by Gentner and Clement (1988), McGlove and Manfredi (in press), and Ortony, Vondruska, Foss, & Jones (1985). Classification of each metaphor as attributional or relational, or a hybrid was made on the basis of a pretest using procedures described by Gentner and Clement (1988).
The distinction between the accessibility and availability of conceptual information in metaphor interpretation figures prominently in the dispute over the potential role that conceptual metaphors might play in figurative language comprehension. Lakoff and his colleagues have argued that conceptual metaphors underlie our use and understanding of conventional figurative expressions in a variety of domains. For example, consider the different metaphors that are reflected by idioms we use to describe anger. One conceptual metaphor for anger is that of heated fluid under pressure. Idioms that seem to reflect this conceptual metaphor include flip your lid, let off steam, and blow your top. An alternative conceptual metaphor for anger is that of animal-like behavior, reflected in idioms such as bite someone’s head off or hopping mad. Although broad conceptual metaphors seem to motivate many idiomatic expressions (Gibbs, 1994), their functional role in idiom use and comprehension is questionable. When people encounter an idiom such as blow your top in text or conversation, is the ANGER IS HEATED FLUID UNDER PRESSURE metaphor merely available, or, as Lakoff (1990) has argued, automatically accessed? A conceptual structure is “available” simply if it is represented in a given language user’s semantic memory (Miller & Johnson-Laird, 1983). Although many theorists have raised serious doubts about whether conceptual metaphors are so represented (Jackendoff & Aaron, 1991; Murphy, 1996; McGlone, 1996) we will stipulate that they are for the present discussion. The availability of a conceptual structure is, by definition, context independent: it is either stored in semantic memory or it is not. In contrast, access to a conceptual structure that participants in language comprehension is typically context dependent: It may be retrieved in certain contexts but not others (e.g., Anderson & Ortony, 1975).

What determines whether a conceptual metaphor will be accessed to guide idiom comprehension, as opposed to being merely available (albeit dormant) in semantic memory? One important factor is the operative time-constraints in the circumstances under which an idiom is encountered. The normal pace of conversation would seem too fast for interlocutors to retrieve the entire conceptual metaphorical underpinnings of a phrase like blow your top (Glucksberg, Brown, & McGlone, 1993). From a functional standpoint, it is not clear that there is any utility to retrieving a complex metaphorical structure when merely retrieving the phrase’s relevant import — i.e., someone got really angry — would suffice (Glucksberg, Brown, & McGlone, 1993). As with most words, the comprehension of idioms may functionally proceed in many contexts without recourse to or awareness of their etymological origins.

However, there are clearly some contexts in which retrieval of a figurative expression’s metaphorical underpinnings is quite functional. For example, when one is reflecting on why she thinks an idiom means what it means (e.g., a language teacher describing how to use an idiom appropriately or, conversely, a student explaining to a language teacher why he thinks an idiom means what it means), it would be quite functional to retrieve as much of its underlying metaphorical structure as possible. Bortfeld (1997) demonstrated that, in such cir-

### Table 1. Examples of the context and target sentences used in investigate metaphor processing sets.

<table>
<thead>
<tr>
<th>ATTRIBUTIONAL CONTEXT METAPHORS</th>
<th>RELATIONAL CONTEXT METAPHORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jellybeans are balloons.</td>
<td>Smiles are magnets.</td>
</tr>
<tr>
<td>The sun is an orange.</td>
<td>Sarcasm is a well.</td>
</tr>
<tr>
<td>Soap suds are whipped cream.</td>
<td>Crime is a cancer.</td>
</tr>
<tr>
<td>Some roads are snakes.</td>
<td>Suckers are bulldozers.</td>
</tr>
</tbody>
</table>

**TARGET HYBRID METAPHOR**

Tree trunks are drinking straws.
circumstances, there is a surprising degree of consistency in people’s accounts of their understanding of idiom’s metaphorical derivations, even among non-native speakers who have just learned an idiom from a new language. For example, when asked about their understanding of the idiom blow your top, both native and non-native speaker’s report mental images of containers about the size of one’s head bursting open and spouting their contents upward, as opposed to envisaging someone expelling air at a spinning child’s toy. This evidence suggests that the conceptual correspondences comprising the metaphor ANGER IS HEATED FLUID UNDER PRESSURE may very well be represented in semantic memory and thus are available for retrieval in interpretational circumstances that are conducive to reflection.

A very different sort of reflective context in which conceptual metaphorical information is likely to be accessed is that of someone reading prose for pleasure or an analytic purpose. In these cases, both the lack of time constraints and the motivation to make intertextual connections are conducive to the reader retrieving and using conceptual metaphorical information. Interpreting metaphorical language in this context as opposed to how one does in a typical conversation parallels the distinction Gerrig and Healy (1983) drew between metaphor appreciation and comprehension. These researchers argued that while both types of metaphor processing may potentially draw from the same knowledge base, the representation of metaphor meaning in comprehension is a truncated version of that created during appreciation. A truncated representation is perfectly functional when the goal is merely to comprehend a metaphor; in contrast, an appreciative assessment of the metaphor (e.g., judging whether it is relatively apt or inapt) requires a richer representation. Gerrig and Healy’s demonstration that differences in metaphor aptness (e.g., Drops of molten silver filled the night sky is highly apt, while Drops of molten resin filled the night sky is less so) do not translate into differences in comprehension time is consistent with the claim that appreciation and comprehension constitute distinct modes of metaphor processing.

Conclusions

Our survey of psychological research on metaphor interpretation leads us to two conclusions. First, the manner in which figurative expressions are interpreted is only partially determined by their linguistic structure. While in some extreme cases metaphors may be classified as purely attributional or relational in nature, there are many which constitute hybrids of these species. How these hybrid metaphors are interpreted depends not only on conceptual representations available in semantic memory, but also the processing set that is active when the expression is interpreted. Analogously, the availability of an underlying conceptual metaphor for understanding a conventional figurative expression does not necessitate retrieval of this conceptual information in all contexts in which the expression is encountered. Whether the interpreter will employ a conceptual metaphor processing set depends critically on the operative time constraints in the interpretational context, as well as on the goals of the interpreter.

Second, the dispute over which process model constitutes the “definitive” processing account of metaphor interpretation may simply be a red herring. Just as our interpretations of a given literal phrase structure or polysynonymous word can be dramatically influenced by processing sets, so might our interpretations of metaphorical language from context to context and goal to goal. In this regard, metaphor theorists should distinguish between cases in which there is a legitimate conflict between models and other cases in which the models describe different points on a continuum of metaphor processing.

References


Processing unfamiliar metaphors in a self-paced reading task

Frank Brisard, Steven Frisson & Dominiek Sandra
University of Antwerp, Prinsstraat 13, B - 2000 Antwerp
frank.brisard@ufsia.ac.be, steven.frisson@ufsia.ac.be, dominiek.sandra@ufsia.ac.be

Abstract

In a series of online experiments, we investigate the processing characteristics of metaphorical subject-predicate structures, measuring reading times directly upon the presentation of the metaphorical targets, instead of tapping RTs after subjects went through complete sentences. If a literal meaning is activated in the early stages of metaphorical comprehension, conclusions can be drawn regarding the time-course of interpreting metaphorical language as the reader gradually proceeds through the sentence. The 'Literal First' hypothesis predicts that processing metaphorical instances of an expression type 'an x is a y' will proceed more slowly than in the case of literal statements of the same type, since all (literal) members of a category must be assessed before a metaphorical interpretation is initiated. This prediction is confirmed by the results, but qualifications need to be made regarding the point in processing at which such distinctions become operational. Stimuli were presented with and without a preceding disambiguating context. Results show that metaphorical sentences preceded by such a “rich” context are easier to process than metaphors presented out of context and, in fact, show no differences with corresponding literal statements in the very first stage of processing (when the actual metaphorical word is read). Differences between literal and metaphorical stimuli with preceding context show up later in the sentence, i.e., as soon as one word after the metaphorical target. Furthermore, what seem important determinants of processing time - degree of membership (prototypicality) and metaphor aptness - may not affect processing in a self-paced reading environment.

1 Introduction

Probably the most influential model still available to date for the description of the time course involved in processing metaphorical language starts from the so-called 'Literal First' hypothesis, which observes that the interpretation of metaphors needs to pass through a stage in which the literal meaning of an utterance is processed before its figurative meaning can be computed. The hypothesis is derived from the Stage Model of metaphor comprehension, which originated in philosophy. In their semantic theories, people like Searle and Grice distinguished between sentence meaning and utterance or speaker's meaning, reflecting the distinction between what is said through an utterance (i.e., the conventional, literal meanings of words and how they are syntactically combined) and the ulterior meaning the speaker wishes to express, which can only be implicated in the case of metaphors. According to this model, language users encountering metaphorical statements first determine the sentence meaning, then discover that this meaning cannot be what the speaker intended (since it is literally "false"), only to reject the literal meaning afterwards in favor of a derived, contextually computed figurative meaning. In other words, a literal processing stage is mandatory for metaphor comprehension, as it is impossible, in this view, to understand metaphorical meanings straight away.

In order to verify the claims of the Stage Model, or rather of its psychological counterpart (Literal First), the hypothesis is put forward that, if a metaphorical meaning must be derived from, or in any case ulterior to, a previously determined literal one, metaphors must take longer to process than (matched) literal propositions. To test this, it is necessary that the processing of metaphors is tapped online, i.e., immediately after presenting the metaphorical item in question, instead of at the end of an entire proposition/sentence containing that item. This can be done most effectively with experimental stimuli that are limited to the fairly simple structure of categorization statements, viz., 'an X is a Y'. According to the Class Inclusion model proposed by Glucksberg and his associates (e.g., Glucksberg & Keysar, 1990), instances of metaphorical language, especially when they are of the categorization type distinguished above, invite language users to make classifications which do not fit any normal taxonomy. If somebody says friends are trees, she is asking us to consider that some items are not only people but also trees, a taxonomic error, unless of course only the relevant similarities are sorted out. Theoretically, of course, this sorting and the resulting non-literal interpretation need not occur after a literal interpretation is attempted. But how could this be experimentally demonstrated?

Many experiments have already been carried out with exactly the type of items used in the present series. For instance, Gildea & Glucksberg (1983) have used them to investigate whether the literal meaning of a metaphorical expression can be responded to before the metaphorical meaning is available, which would be predicted by Literal First. In the experiment, subjects had to decide whether sentences were "literally false" or not, i.e., they had to monitor for the literal meaning...
of the sentence only and react on that. Response times and error rates were compared between two categories of literally false items: metaphors and non-metaphorical false statements. The authors demonstrate that it is difficult for subjects in a speeded response experiment to answer ‘no’ to sentences like all jobs are jails, with longer decision times and higher error rates observed for such metaphorical items. This shows that the availability of a true metaphorical meaning interferes with the execution of a negative response. However, as the authors themselves remark, these findings cannot really reject Literal First, since the processing of the metaphorical meaning in a second stage may be so fast and automatic as to interfere with the processing of the literal meaning regardless of its secondary status. These experiments, in other words, only show that metaphor processing is highly automatic, i.e., that it cannot be brought under the conscious control of subjects (to facilitate task compliance), yet they remain neutral as to the involvement of metaphorical meanings in an initial processing stage. The observation that subjects find it difficult to reject metaphors as literally false does not demonstrate that they do not process the literally false proposition during metaphor comprehension. It merely shows that the metaphorical interpretation is arrived at very quickly and that there is no time for subjects to consider the literal meaning without also having to consider the metaphorical one.

The interpretive ambiguity in Gildea & Glucksberg (1983) derives from the fact that they used an indirect method to compare literal and metaphorical processing, i.e., through the effect of metaphorical meanings on literal ones. In contrast, Gibbs (1994) made a direct comparison between the processing times of literal sentences and metaphors. In his experiment, it is demonstrated that metaphorical expressions, which were matched against a set of literal sentences on relevant processing variables, did not take longer to process. Accordingly, Gibbs questions the psychological validity of the Literal First hypothesis. However, as with Gildea & Glucksberg (1983), this experimental paradigm may not be the best way to assess Literal First. First, a null effect is never a good basis for drawing important theoretical conclusions, and, secondly, Gibbs only measured processing times at the end of sentences. Finally, other studies (e.g., Onishi & Murphy, 1993) have tried to show that, as far as processing claims are concerned, a distinction needs to be made between metaphorical sentence predicates of the type considered here, which may bypass literal meanings under certain conditions, and metaphorical referring expressions, where the metaphor does not appear as a predicate and typically gives rise to processing difficulties when compared with literal referring expressions. In sum, if Gibb’s research, in particular, indicates that literal and metaphorical meanings may be processed equally fast, the methodology used does not allow him to show that this is due to the use of an identical processing routine (a single stage for both types of language use). As Gibbs did not employ a genuine online method to measure reading times within sentences, small effects may simply have been undetectable. In order to be able to make statements on the processing routine itself, one must track the course of interpretation more meticulously. This is what can be achieved by using a self-paced reading task. We ran two experiments in which this technique was applied.

2 Degrees of membership and prototypicality

In the experiments reported below, we will make a direct comparison between the processing times of metaphorical and literal expressions. We will create the best matching possible between material types, as we will simply use the same predicate structures (with differing preceding subjects) for the literal and metaphorical conditions. To achieve real online accuracy, we will also make use of a technique, self-paced reading, which stays closer to the language user’s real-time processing than the one used by Gibbs. In a self-paced reading experiment, a reader has to gradually move through a sentence at her own pace (cf. section 3.2). A timing device measures the time during which each word within a sentence remains on the screen of a computer.

The purpose of the experiments is (1) to study differences and similarities in the online (word-for-word) processing of literal and metaphorical sentences, and (2) to do so in two different linguistic conditions: with strong supportive preceding context (supporting either a metaphorical or a literal reading of the target sentence) and with no preceding context at all. Both literal and metaphorical sentences are of the categorization type an x is a y, followed by additional linguistic material (relative clause, prepositional phrase, …) modifying the category name y. Thus, for each target word two sentences are produced that share the same lexical material from the category name onwards (up until the end of the sentence), but which differ in the kinds of subject assigned to the category in question. This differentiation in subject assignment is therefore the only factor possibly differentiating between a literal and a metaphorical reading of the resulting categorization statement:

Literal: An oak is a tree.
Metaphorical: A friend is a tree.

Within the set of literal sentences, a further distinction is made between prototypical and peripheral members of the category at issue (e.g., for ‘tree’, oak would be prototypical and maple peripheral, as
established on the basis of pretests). For metaphorical sentences, we differentiate between apt and non-apt metaphors, that is, between sentence types where the assignment of a metaphorical subject would result in metaphors of a fairly high quality (again established on the basis of pretests, cf. below) and those where this is not the case. All metaphors thus created are non-existing, non-conventionalized instances, i.e., for the present experiments we only consider novel metaphor types.

The rationale for the following experiments starts from the presumption that, when measured on the category name in a self-paced reading task, targets appearing in literal sentences should, on the whole, be read faster than those which occur in metaphorical sentences. This is motivated by the contention, within Literal First, that literal meanings need to be processed before a figurative one can start being computed at all. For the present experiments, this means that the problematic category status of metaphorical targets needs to be established first, and only then can subjects begin to look for possible alternative meanings/categorizations (which they typically have to do if they are to understand the meaning of the sentence as a whole). In addition, we predict that, within the global conditions (literal vs. metaphorical), differences in reading times on targets will also reflect the degree of membership that can be attributed to the subjects of these sentences, so that targets (e.g., tree) would be read slower when preceded by peripheral members (e.g., maple) than when they appear in sentences containing prototypical subjects (e.g., oak). (This particular prediction should fall out of the standard results reported in the prototype literature.) For metaphors, the latter qualification relates not so much to the status of a category member (since no existing category is conjured up in these metaphorical statements), but rather to their contribution to the quality of the resulting metaphor. Thus, the prototypical vs. peripheral status of category members in literal statements is complemented by the distinction in aptness between metaphorical statements, such that targets in non-apt metaphors should be read more slowly than those in apt ones, simply because aptness reflects the ease of “categorization” involved in the metaphor.

By carefully selecting the items along these parameters, we can also investigate the more general hypothesis that targets in apt metaphors are processed more quickly than those in literal sentences containing peripheral category members. Indeed, the saliency of the shared features might be higher in the former than in the latter condition. In other words, it is possible that one cannot make general statements with respect to metaphorical processing (e.g., all metaphors are processed equally fast as or slower than literal sentences), but that one has to make qualified statements instead, based on factors like aptness and degree of membership of a given category.

3 General method

3.1 Materials and pretests

The items in the experiment gave rise to four conditions, presenting two literal and two metaphorical terms per category. They were selected on the basis of several pretests. Subjects throughout the experiments were native speakers of Dutch and the sentences presented to them were in Dutch as well.

In Pretest 1, a production task, subjects had to write down as many names of category members as they could within a given period of time. Thus, 24 semantic categories, each with its prototypical and peripheral members, could be selected for further use in the experiments.

In Pretest 2, it was investigated whether the contrast between selected prototypical and peripheral items was large enough to be measurable in a reaction time experiment. To check this, we ran a verification task of the type performed by McCloskey & Glucksberg (1979), using counterbalanced lists. (The experiment was run over two non-consecutive days.) Subjects had to verify under time pressure whether the prime, the first item presented (during one second), was a member of the category whose name was given immediately afterwards (the target). The results showed that the literal prototypical items, as derived from Pretest 1, were indeed verified faster than the peripheral ones (with significant differences in subject and item analyses, both ps < .05). This allowed us to use these two item sets in the actual experiments, with their status as prototypical/peripheral category members empirically tested.

In Pretest 3, we focused on metaphorical combinations with the purpose of discriminating between apt and non-apt terms. Metaphorical terms were added to the categories selected from Pretest 1, so that unfamiliar metaphors were created. Subjects in this pretest had to assess the quality of the metaphorical subject-predicate relationship on a seven-point scale. We obtained reliable differences between two sets of metaphorical items, which we called apt (mean rating = 4.50, standard deviation = 0.70) and non-apt (mean rating = 1.76, standard deviation = 0.23), respectively. In addition, all metaphors scored around or below average on a seven-point scale for conventionality (i.e., they were generally considered fairly unconventional, with the highest – most conventional – group topping an average of 3.66, SD 1.08, and the lowest half averaging at 1.53, SD = 0.34).

Subjects in Pretest 4 had to assess the quality of the metaphors remaining from the previous pretest
(where only items with a low degree of conventionality were marked for selection). This time, full sentences were presented, consisting of a categorization statement ('an x is a y') plus additional material following the target. Although the rating distance dividing apt and non-apt sentences proved to be smaller than in the previous pretest (average ratings = 3.72 and 3.18, respectively), the difference remained.

These selection procedures resulted in 12 sentences, each giving rise to four different conditions depending on the status of the subject term (translated from Dutch here):

- **LITERAL & PROTOTYPICAL**: e.g., An oak is a tree with very firm roots and thick branches.
- **LITERAL & PERIPHERAL**: e.g., A maple is a tree with very firm roots and thick branches.
- **METAPHORICAL & APT**: e.g., A friend is a tree with very firm roots and thick branches.
- **METAPHORICAL & NON-APT**: e.g., A racist is a tree with very firm roots and thick branches.

In the experiments, a second target (target2) is distinguished which falls together with the syntactic end of a clause (in the above example, 'target2' will coincide with the word roots). This second target indicates the point at which subjects have enough material to wrap up their interpretation of the proposition as a whole. In case metaphorical sentences of the present type cause subjects to put their interpretation on hold, as it were, until more material is available for interpretation, differences in significance between the first and the second target should reflect this.

Considering the way the materials have been constructed, they constitute 12 sets of matched quartets. Additional filler material was created with sentences that had the same initial structure ('an x is a y') as the critical items. Of these fillers (24 in total), one half was metaphorical, in the sense of not providing an established categorization of the grammatical subject, while the other half presented literal statements. In turn, half of the metaphorical fillers were considered good metaphors (as established through pretests), while the other half yielded less good items. For literal sentences, half of the filler set presented prototypical members and the other half contained peripheral ones.

All of these items were distributed over four lists, with each of the lists yielding two separate randomized orders. To each list, the same filler items were added. The critical items were distributed across the lists, according to the following criteria: each list contained all of the twelve category names (no one category appeared twice in a list), with three literal & prototypical instances, three literal & peripheral ones, three metaphorical & apt ones, and three metaphorical and non-apt ones. Thus, each list contained the same number of sentences (3) for each of the four conditions distinguished in the present study.

There were fifteen subjects for each list in experiment 1 and ten for each list in experiment 2.

### 3.2 Procedure

Before the experiment started, subjects were orally instructed about the relevant aspects of the experimental procedure. During the experiment, they were sitting in front of a computer screen in a darkened room. The experimental sentences appeared on the screen one by one. For each sentence, a number of dashes represented the words contained in that sentence without revealing the actual words themselves beforehand. The subjects’ task was to proceed through this masked sentence one word at a time, by making use of the middle button on a button box. Each time this button was pressed, a new word would appear (and the previous one would disappear). Subjects were told to go through the entire sentence this way, maintaining a reasonable reading speed while making sure they saw and understood each of the words making up the sentence.

After the sentence was read, the same question appeared, viz., ‘Do you agree with this statement?’, upon which subjects had to indicate their answer by pressing the left- or rightmost button on the button box. This question was inserted to ensure that subjects were motivated to attend to the content of the sentences, instead of to their formal characteristics. They were required to answer the question in a fully personal and subjective way, stressing the focus on content even more. Many of the filler sentences were so designed that more or less controversial statements would be encountered once in a while, so that the task became varied enough to continue to attract the subject’s attention.

Each experiment contained two pauses of ten seconds, which subjects could abort if they wanted to proceed faster.

### 3.3 Subjects

For Experiment 1, 60 undergraduate language students volunteered. In Experiment 2, 40 undergraduate language students participated. No subject participated more than once in any of the (pre)tests. All students were native speakers of Dutch.
4 Results

4.1 Experiment 1

Average reading times were calculated on the target word, i.e., the category name \( y \) (which is the point in the sentence where the literal or metaphorical status becomes clear, cf. above) and on the following word (target+1). This last data point is considered important because it is known from previous research (e.g., in eye tracking) that effects spill over to adjacent words. Reaction times were also measured on target2 (cf. above).

Table 1 shows the reading times for the four conditions on the target position in Experiment 1. The data for target+1 lead to the same conclusions:

Table 1: Experiment 1, mean RTs (in ms) and standard deviations for target

<table>
<thead>
<tr>
<th>target (category name)</th>
<th>Condition</th>
<th>RT</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>literal;</td>
<td>491</td>
<td>155</td>
<td></td>
</tr>
<tr>
<td>prototype literal;</td>
<td>460</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>peripheral metaphor;</td>
<td>528</td>
<td>189</td>
<td></td>
</tr>
<tr>
<td>apt metaphor;</td>
<td>530</td>
<td>215</td>
<td></td>
</tr>
<tr>
<td>non-apt metaphor;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Literal sentences were read significantly faster than metaphorical counterparts \( (F_1[1, 59] = 12.12, p < .001; F_1[1, 11] = 8.21, p < .05) \). Pairwise analyses demonstrate that literal prototypes were read faster than apt \( (F_1[1, 59] = 4.14, p < .05; F_1[1, 11] = 4.86, p < .05) \) and non-apt metaphors \( (F_1[1, 59] = 4.57, p < .05; F_1[1, 11] = 5.35, p < .05) \), and the same holds for peripheral items (against apt metaphors: \( F_1[1, 59] = 13.72, p < .001; F_1[1, 11] = 16.07, p < .01 \); against non-apt metaphors: \( F_1[1, 59] = 14.49, p < .001; F_1[1, 11] = 16.95, p < .01 \)). Thus, Experiment 1 shows an overall sense effect.

The two other semantic factors in the design – prototypicality and aptness – yield non-significant effects, however. No pairwise analysis indicates significance for any factor within literal or metaphorical conditions (on prototypicality and aptness, respectively). In fact, on target+1, as can be seen in Table 2, the overall sense effect remains \( (F_1[1, 59] = 29.77, p = .0001; F_1[1, 11] = 30.36, p < .001) \), but (literal) peripheral items are no longer read faster than prototypes, in contrast with the (non-significant) results on target.

Table 2: Experiment 1, mean RTs (in ms) and standard deviations for target+1

<table>
<thead>
<tr>
<th>target+1</th>
<th>Condition</th>
<th>RT</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>literal;</td>
<td>420</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>prototype literal;</td>
<td>423</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>peripheral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>metaphor;</td>
<td>458</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>apt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>metaphor;</td>
<td>475</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td>non-apt</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are still no significant effects to be found within the two main conditions (literal vs. metaphor), i.e., prototypes are not significantly faster than peripheral items (all \( F_1 < 1 \)), and neither are apt metaphors with respect to non-apt metaphors \( (F_1[1, 59] = 1.94, p > .1; F_1[1, 11] = 2.01, p > .1) \). Especially the failure to find a difference between sentences with prototypical and peripheral category members is surprising, in light of the large literature on prototype effects. Note that this null effect cannot be readily discounted, since the same data set gave rise to significance in a typical timed verification task environment (see Pretest 2).

On target2 (cf. section 3.1), the overall sense effect between literal and metaphorical sentences remains for the subject analysis \( (F_1[1, 59] = 4.71, p < .05) \) and marginally in that of the items \( (F_1[1, 11] = 3.76, p < .08) \). At this point in the processing of the sentence, a difference between (literal) prototypical and peripheral items is beginning to emerge, in the sense that the prototypical condition stands out as the fastest one by almost 40 ms, when compared to the peripheral condition, but no significance can still be found between them \( (F_1[1, 59] = 1.94, p > .1; F_1 < 1) \).

Table 3: Experiment 1, mean RTs (in ms) and standard deviations for target2

<table>
<thead>
<tr>
<th>target2</th>
<th>Condition</th>
<th>RT</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>literal;</td>
<td>564</td>
<td>238</td>
<td></td>
</tr>
<tr>
<td>prototype literal;</td>
<td>607</td>
<td>280</td>
<td></td>
</tr>
<tr>
<td>peripheral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>metaphor;</td>
<td>631</td>
<td>327</td>
<td></td>
</tr>
<tr>
<td>apt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>metaphor;</td>
<td>650</td>
<td>305</td>
<td></td>
</tr>
<tr>
<td>non-apt</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 summarizes the time course of literal and metaphorical processing over three different data points:
In general, Experiment 1 shows that it takes longer to process the same set of words when the first of these words (the category name) is interpreted metaphorically than when it is interpreted literally. This may not be all too surprising, of course, as subjects in the experiment received no preceding context sentence. They may have been slow on the metaphors simply because they missed the relevant information to make the intended metaphorical interpretation (remember, these are unfamiliar metaphors). From this perspective, Experiment 1 can be considered a benchmark for Experiment 2, which introduced a context motivating in advance the sentence that followed it, whether metaphorical or literal.

4.2 Experiment 2

Items in this experiment were of the following type:

**CONCEPT:**
Great deeds don’t need large audiences.

**TARGET:**
A painter/poet/spider/bear is an artist [target] who lives on his talents [target2], in silence.

The context sentences were the same for literal and metaphorical conditions. They had been carefully selected on the basis of pretests. In one pretest, subjects had to choose between two possible context sentences on the basis of considerations of semantic integration. In another, they had to assess the degree of semantic congruity between context and target sentence on a seven-point scale. In the pretests, while critical items were obviously preceded by meaningful context sentences, half of the filler items followed nonsense context sentences (i.e., grammatical sentences unrelated to the topic of the target sentences), included to counterbalance the high degree of semantic integration for good context sentences. The four conditions were matched on contextual fit.

Figure 2 compares results from Experiment 2 with those from Experiment 1, for the target position:

On target position, there is no significant overall sense effect in Experiment 2, in contrast with Experiment 1 ($F_1, [1, 39] = 3.22, p > .1; F_1, [1, 11] = 2.29, p > .1$), and no interactions could be found. Both peripheral and non-apt meanings are processed faster in the literal and the metaphorical condition, but, as in Experiment 1, this does not yield significant effects either (literal proto vs. peri: all $F_1 < 1$; metaphorical apt vs. non-apt: all $F_1 < 1$). Globally, all response times are much shorter than in Experiment 1 (a difference of about 200 ms on average or one third of the reaction times in Experiment 1). On target+1, there is an overall advantage of literal sentences (faster) over metaphorical ones, as in Experiment 1, but only in the subject analysis ($F_1, [1, 39] = 3.41, p < .08; F_1, [1, 11] = 2.05, p > .1$). Moreover, out of all the results obtained over the two experiments, it is only at this position in Experiment 2 that non-apt metaphors perform worse (longer RTs) than apt ones, though non-significantly so ($F_1, [1, 39] = 1.80, p > .1; F_1, [1, 11] = 2.44, p > .1$).

On target2, no sense effect can be distinguished between literal and metaphorical conditions ($F_1 < 1; F_1, [1, 11] = 1.34, p > .1$). This absence of a sense effect at a rather advanced stage in the processing of the sentence is surprising, especially when compared to the same position in Experiment 1, where significance was obtained. On the other hand, target2 in Experiment 2 offers the first glimpse of a significant prototype effect for the literal conditions, in contrast with Experiment 1 ($F_1, [1, 39] = 3.84, p < .06; F_1, [1, 11] = 4.27, p < .05$). Thus, the suggestion of a prototype effect discovered for Experiment 1 is borne out in the second experiment, indicating that, in real-time processing of categorial statements of the type analyzed, a prototype effect only begins to play when subjects reach the final parts of the sentence, instead of immediately after the presentation of the categorization ('an x is a y') proper.

Figure 3 summarizes the results for Experiment 2 over the three data points distinguished:
In comparison with Figure 1, we notice, first of all, the systematically lower reading times for all data points concerned, which is due to the effect of a preceding context for both literal and metaphorical conditions. Also, effects within conditions (prototype vs. peripheral, apt vs. non-apt) typically only begin to emerge towards the end of a sentence, and this is true for both experiments (i.e., irrespective of a preceding context). On target and target+1, in other words, differences within conditions, over both experiments, are generally too small to yield significance. Finally, Experiment 2 only shows an overall sense effect between literal and metaphorical conditions at target+1, which constitutes the main distinction with respect to Figure 1.

5 Conclusion

The present research on online metaphor processing, using a self-paced reading technique, shows that metaphorical sentences not embedded in a “rich” context are more difficult to interpret than literal sentences. In itself, this is a rather trivial finding, but at least it offers empirical confirmation of ‘Literal First’ under the conditions specified (new metaphors, no preceding context). In contrast, a preceding context that directly addresses the ground for the metaphor that is to follow annihilates differences between literal and metaphorical sentences at target position and, later, at target2 as well. This may be due to the preceding context sentence, which prepares subjects for the non-literal statement that follows and thus helps them interpret it more readily. Quite plausibly, however, the lack of differentiation between metaphorical and literal statements can also be the result of a floor effect, since, with a preceding context, sentences in both literal and metaphorical conditions are processed extremely rapidly (cf. Figures 2 & 3).

Still, even when preceded by a relevant context, sense differences between metaphorical and literal conditions return as quickly as one word down the processing stream. That is to say that the literal/metaphor distinction is reestablished at the next word. This evidence does not favor an undifferentiated rejection of the stage model, as might at least be expected in a context where metaphors are preceded by material that is semantically highly motivating and introduces the topic of the metaphor quite readily. Apparently, the status of the metaphors considered here, which are novel, does not warrant a model in which metaphorical senses, as necessarily created online by subjects, can come about without first processing literal meanings (see also Gerrig, 1989). Of course, this is not to say that the same is bound to happen for established metaphors, where existing meanings can quite conceivably be retrieved without the help of previously processed literal meanings.

Finally, we can reliably assume that what seem important determinants of processing time – degree of membership (prototypicality) and metaphor aptness – may not affect processing in self-paced reading. Within both metaphorical and literal conditions, no significant effects could be found throughout the two experiments, except for two instances. As far as the prototype-peripheral distinction is concerned within the literal condition, this only yields (near-)significant differences in a very late stage of processing, typically around the end of a sentence. This suggests that so-called prototype effects may merely be some kind of memory effect and not really relevant to early processing concerns at all, when an interpretation (i.e., a categorization) is incrementally built up. As to the distinction between apt and non-apt metaphors, which has sometimes (e.g., Blasko & Connine, 1993) been taken to influence metaphor comprehension, no systematic indications can be adduced from the present experiments to the effect that this difference plays a significant part in the course of metaphor processing. This holds true for early as well as later stages of processing, suggesting that the distinction, if empirically verifiable at all, is more a matter of off-line processes.

References


Metaphor and the damaged brain: How research into the damaged brain can provide insight into normal literal and non-literal processing.

Katy Auty & Rosemary Varley

Department of Cultural Studies, University of Central Lancashire, Preston. k.auty@uclan.ac.uk.
Department of Human Communication Sciences, University of Sheffield.

Abstract

Damage to the right non-dominant language hemisphere is reported to result in communicative deficits that are not concerned with the core linguistic applications of lexis and/or grammar. Instead deficits are manifested in higher level language functioning (Eisenson 1962) such as metaphor and other types of non-literal language. The neurolinguistic literature maintains that there is a divide between the use of literal and non-literal language and further claims that the non-literal language deficits observed in the right hemisphere damaged population are not immediately apparent in everyday conversation. The existence of such a dissociated deficit however, is at odds with the claims of the contemporary theory of metaphor (Lakoff 1993). The view asserted here is that metaphor is not grounded in language but in thought. Metaphor is ubiquitous in everyday conversation and not confined to extra-ordinary language domains. The communicative deficits observed in the right hemisphere damaged population therefore provide a testing ground for these conflicting viewpoints.

1. INTRODUCTION

Metaphor has traditionally been regarded as the most fundamental form of figurative language. It is through the use of metaphor that we are able to be both imaginative and creative. There is however, much discussion and debate as to the nature of metaphor and to its place and function within both the linguistic and conceptual system. This paper will firstly examine the different theoretical approaches applied to metaphor and other figurative language. It will then move on to present data from brain-damaged subjects. The damaged brain will thus be used as means of providing insight into literal and non-literal processing in the normal brain.

There is a long history of writings on metaphor that date back to Aristotle who described metaphor as "...the application to one thing of a name belonging to that of another" (De Arte Poetica, 1457b). Aristotle's work may be seen to constitute one of the two main approaches to the interpretation of metaphor and its role in linguistic and communicative behaviour. These two traditional approaches are known as the Classical View and the Romantic View, Aristotle being the originator of the former.

The key factor distinguishing these two approaches is the way in which the place of metaphor and figurative language within the linguistic system is viewed. The Classical View regards metaphor as a decorative addition to language. It is a special type of language that is employed at certain times for a certain effect. It exists outside the domains of normal every day 'plain' language. Metaphor then is what draws the divide between 'normal' language and poetic language. Thus, according to this view, what is literal and what is figurative may be clearly distinguished.

The Classical View regards metaphor as a rhetorical device and one that the poet is best skilled in. A cornerstone of this view is the belief that the use of metaphor both by encoder and decoder requires special processing by the language user.

This account of metaphor can be seen to be linked with more modern accounts of non-literal language, most particularly with literal language theory. The stance taken here is that in order for a language user to interpret a metaphor they must firstly detect the anomalous nature of the language that is presented to them. It is assumed that a literal interpretation must always be initially attempted. When this route is blocked because of the anomalous nature of the language, a different strategy is then employed (Grice 1975; Searle 1979). This alternative strategy is a non-literal one. Literal interpretation of language is therefore seen not only as the default mechanism but also as the starting point for the interpretation of all forms of language, both literal and figurative.

A very different interpretation of metaphor and figurative language is proposed by the Romantic View. This theory is associated with eighteenth and nineteenth century views of the imagination but its roots may be seen to stem from Plato's work on the nature of language itself. Plato resisted Aristotle's dictum that rhetorical language like poetic language is somehow separate from other types of language. Plato instead regarded language as a unified whole and any attempt to separate it into component parts was a violation of this unity (Hawkes, 1972:35).

The Romantic View also regards language as a unified whole and thus directly opposes the notion that metaphor exists outside the domain of normal every day language. It instead claims that all language is metaphoric and that there is no divide between what is
literally and what is non-literal. Metaphor is placed firmly within the realms of normal everyday language. It is not merely a rhetorical device which is employed on certain occasions for certain effect, nor is it a special code used properly only by the poet.

Metaphors are regarded as being central to our understanding and experience of the world. They form an important part of the language user’s conceptual system but this system is culturally determined. In this way, metaphors are regarded not as being the private domain of the individual but instead as an integral property of the wider cultural community. Metaphors determine the way in which we experience the world.

An extension of the Romantic View can be found in modern linguistics in the school of Cognitive Semantics. The Classical View placing metaphor outside the domain of normal language is again rejected. Metaphor is seen as providing the language user with a way of regarding, discussing and indeed experiencing the world (Lakoff & Johnson 1980; Lakoff 1987; Lakoff & Turner 1989; Lakoff 1993). The prevalence and importance of metaphor in normal everyday language is stressed (Gibbs 1994). Significantly though, this modern view rejects the notion that all language is metaphorical. The argument being that: ‘metaphors allow us to understand one domain of experience in terms of another. To serve this function, there must be some grounding, some concepts that are not completely understood via metaphor to serve as source domains’ (Lakoff & Turner, 1989:135).

This approach receives strong support from the psycholinguistic literature. Experimental evidence with normals does not uphold the view proposed by literal language theory that metaphor and other types of figurative language require special decoding by the language user (Cacciari & Glucksberg 1994; Gibbs, 1994). Furthermore non-literal interpretations of metaphor may be activated prior to literal interpretations being attempted. Literal interpretations must therefore not be regarded as either primary or necessary to language decoding processes. This view is of course ‘contrary to the widely held assumptions in linguistics, philosophy and literary theory that such language violates or flouts, norms of co-operative conversation’ (Gibbs, 1994:143).

A key claim made by the contemporary theory of metaphor (as coined by Lakoff 1993) is that not only is metaphor an essential component of ordinary linguistic function but also that the ubiquity of metaphor in everyday language raises the notion of figurative thought. Lakoff in discussing the nature of metaphor claims that ‘metaphor is fundamentally conceptual, not linguistic in nature’ (1993:244). Figurative modes of language are seen as being underpinned by figurative modes of thought. Experience is conceptualised in figurative terms and any attempt to quantify the prevalence of figurative language must acknowledge that literal modes of language may themselves be underpinned by figurative modes of thought (Gibbs, 1994:414).

Lakoff and Johnson’s work in Metaphors We Live By (1980) was ground breaking in that it presented a systematic analysis of both linguistic metaphors and more importantly the conceptual metaphors underpinning them. It is now acknowledged within the cognitive linguistic literature that novel metaphors are not the only type of figurative language worthy of investigation. Conventional metaphors are not merely lexicalised units that have subsequently lost their metaphoricality, as Gibbs says ‘what is conventional and fixed need not be dead’ (Gibbs, 1994:415).

Despite the increasingly vast body of literature on metaphor however, there are still no universally agreed criteria which establish the division between figurative and literal language. Furthermore there is still strong opposition from other fields which resist the notion that metaphor is central to both linguistic and conceptual processing. One of the strongest oppositions to the contemporary theory of metaphor comes from the field of neurolinguistics. It provides an alternative account to metaphoric processing not only in the normal brain but also in the damaged brain and it is to this area that the focus of this paper will now turn.

2. NEUROLINGUISTIC EVIDENCE ON METAPHOR

Since Broca discovered in 1865 that damage to the left cerebral hemisphere resulted in a specific language disorder, later named aphasia, there has been a great deal of research in the area of language and the brain. For the vast majority of right handers, the left hemisphere is dominant for language. Impairments of grammar and / or lexis invariably result from damage to this hemisphere.

The situation regarding the right, non-language dominant hemisphere is less clear. Deficits associated with right hemisphere damage (henceforth RHD) certainly do not fall within core linguistic applications such as lexis and grammar. Furthermore, difficulties may at first not be apparent to the casual observer. Nevertheless, language users who have suffered RHD do experience communicative difficulties. RHD patients are typically described as being tangential, verbose and over-literal. It is this last characteristic of a concreteness and rigidity of thought that is of interest to this paper.

In 1962 Eisenson hypothesised that ‘in an adult population right cerebral damage is associated with linguistic and intellectual modification’ (1962:52) and that ‘the right cerebral hemisphere might be involved with super- or extra-ordinary language function’ (1962:53). Fifteen years later, Winner and Gardner published a paper entitled ‘The Comprehension of
Metaphor in Brain-Damaged Patients' (1977). They used a two stage procedure involving metaphor identification and explication. Brain-damaged and non-brain-damaged subjects were initially presented with a series of sentences each of which contained a metaphorical expression. Subjects were required to match each sentence with a picture. Four pictures were simultaneously presented to the subject and each sentence contained a metaphorical expression. In stage two, the pictures were removed and a verbal explanation of the metaphorical expression was sought.

The authors reported that the main finding of this study was a surprising dissociation between RHD and LHD (left hemisphere damaged) aphasic subjects. LHD patients had difficulty giving a verbal explanation of a metaphorical phrase and instead gave a concrete interpretation. They were, however, able to correctly match a metaphorical phrase with a picture of the metaphor. Their failure at the verbal level was explained as being a result of their specific language impairment.

The results for the RHD group were less clear. They were equally as likely to select literal as non-literal depictions of metaphorical phrases but nevertheless had little trouble in giving the correct verbal explanation of the metaphor.

As a result of Winner and Gardner's study and other work that seemed to support their findings, the idea that RHD subjects demonstrate an inability to comprehend non-literal language was seized upon. Eisenson's labelling of an 'extra-ordinary language' deficit was upheld and a detailed picture of the RHD communicative syndrome began to emerge.

Myer's review in 1994 concluded that the following were characteristic features of RHD: difficulty with the comprehension of idiomatic language such as metaphors, idiomatic expressions and proverbs; also difficulty with the comprehension of non-literal language such as indirect requests, verbal irony and inferencing. Furthermore, the only British test battery (Bryan 1994) designed solely for the testing of RHD patients has a whole section devoted to metaphorical language, specifically to the comprehension of this language. Surprisingly though, despite the well-documented visuo-spatial deficits associated with RHD, the RHD battery test, like Winner and Gardner's study, makes use of pictorial material in some of its subtests.

The apparent dissociation of ability between literal and non-literal processing seems to provide the cornerstone of the RHD communicative syndrome. As Paradis explains, 'deficits ... typically involve those aspects of language use other than the ones involved in the literal interpretation of (context-independent) sentences (1998:3).

Despite this posited non-literal language deficit however, the neurolinguistic literature also reports that RHD subjects initially appear communicatively normal. It is only when they are required to engage themselves in 'extra-ordinary language' tasks that their communicative abnormalities manifest themselves.

The neurolinguistic literature seems to point to two possible findings and conclusions:
1) RHD patients have an inability to interpret non-literal language per se.
2) RHD patients have an inability to interpret non-literal language when it is placed in context but may be able to decode it when it is out of context. Both are problematic. With regard to the first hypothesis, we need only cite results such as Winner and Gardner's which demonstrate that RHD subjects do not have a complete and all-encompassing inability to comprehend figurative language. They can do it sometimes. This point is not always made clear (see Myer's review)

The second point regarding context is also problematic because the interpretation of non-literal language is traditionally viewed as being context dependent. Indeed one argument for explaining RHD subjects' failure to successfully interpret non-literal language under test conditions is that test conditions are not conducive to natural conditions. Situational context is largely removed and as a result pragmatic inferences are greatly reduced. This presumably would make the correct interpretation of the non-literal language more difficult.

Despite this, Winner and Gardner seemed to be suggesting that if we aid RHD subjects by placing metaphoric phrases within context (via pictures), they are not able to correctly interpret them. If, however, we remove the contextual information (via verbal explanation of isolated metaphor expression), i.e. make interpretation more difficult, they are able to make an appropriate non-literal interpretation. This seems to be something of an anomaly.

3. AGREEMENT AND CONFLICT BETWEEN THEORY AND DATA

In summary, the neurolinguistic literature, particularly that concerned with RHD communicative deficits, maintains the divide between literal and non-literal language function and usage. Furthermore Eisenson's labelling of an extra-ordinary language dysfunction in the RHD population fits in neatly with the Classical View of metaphor and with literal language theory.

The RHD communicative deficit does not stem from failure to deal with core linguistic applications such as those found in aphasia, but instead stems from a failure to deal with extra-ordinary language such as metaphor which is firmly placed outside the domain of normal, plain language. Furthermore, RHD subjects' apparent failure to decode literal language may also be explained by their reported rigidity and concreteness of thought. Literal language theory states that all interpretations of
language are initially attempted via a literal interpretation. RHD patients have an inability to infer information because they have an inability to revise previous assumptions. They cannot go beyond the first reading i.e the most obvious and the most concrete. This means that their first and only interpretation will always be a literal one.

The findings of the neurolinguistic literature are greatly at odds with the assumptions made by cognitive linguists. The RHD manifestation of an apparent dissociation between literal and non-literal language ability combined with the initial appearance of normality except in extra-ordinary language situations, presents a serious problem for the contemporary theory of metaphor. If non-literal language is pervasive in all forms of language and not just confined to restricted modes such as the creative form of poetry, then a metaphorical deficit should create severe problems for communication even at the most mundane and restricted of levels. Furthermore, if literal language is often underpinned by figurative modes of thought, a metaphorical deficit would surely not confine itself to non-literal language alone?

The present study then is concerned with firstly highlighting the fact that the reported deficits in the RHD population have been obtained from the viewpoint of comprehension. Studies have required subjects to correctly infer non-literal interpretations of metaphorical language. There are however, two sides to language and both input and output should be considered when compiling a communicative profile. This study will begin to redress this imbalance and thus the data presented will be concerned with RHD language output.

The second aim of the study is to use data from the damaged brain to provide further insight into the place and function of metaphor and other types of figurative language in the normal brain and within normal discourse processing. RHD communicative output then can be seen to be a testing ground for these conflicting viewpoints.

If the neurolinguistic literature is to be proved correct, RHD output should be largely confined to literal language only. Furthermore, language that is underpinned by metaphoric thought should prove to be either problematic for the RHD subject or absent from their output.

4. METHOD

4.2 Procedure
Subjects were tape-recorded in conversation with the researcher. The researcher was a trained speech and language therapist but was not involved in their treatment programme. Conversations with each subject followed a typically scripted biographic format. The therapist assumed the role of interviewer and the subject, interviewee. The therapist was thus in control of setting the agenda for the conversation and for determining its length. Each conversation was of approximately thirty minutes duration. All conversations were orthographically transcribed for analysis.

5. ANALYSES
The method adopted for metaphor analysis for this study was that suggested by Lakoff and Johnson (1980). Figurative modes of linguistic expression as well as figurative modes of thought were taken to be examples of metaphor. Instances of metaphor were then categorised according to the underlying metaphor involved (i.e. the underlying figurative thought which enables the production of both novel and conventionalised linguistic metaphor). It is acknowledged however, that these criteria are not unproblematic.

6. RESULTS
Preliminary results clearly indicate that linguistic and conceptual metaphor is prevalent in the data samples and is in fact ubiquitous. RHD subjects are neither confined to literal modes of linguistic expression nor to literal modes of thinking. Their output is not remarkable in this respect and cannot in fact be distinguished from non-brain damaged language output. Samples from two of the subjects are given below:

6.1 Subject One:
T: so how do you spend your days in ***** ****? what do you get up to?
P: oh . it gets my goat . I’m absolutely bored . up and down the passage up and down that passage . up and down that passage .

The italicised linguistic expression is a conventionalised linguistic metaphor but one that is underpinned by the conceptual metaphor TIME IS MONEY. The cognitive linguistic and psycholinguistic literature discuss how a conceptual metaphor can be seen to be the underlying figurative thought which gives rise to a range of metaphoric linguistic expressions. Lakoff and Johnson discuss the TIME IS MONEY metaphorical concept. They demonstrate how
it creates a ‘a coherent system of metaphorical concepts and a corresponding coherent system of metaphorical expressions for those concepts’ (1980:9).

In our society time is regarded as a valuable commodity and is precisely quantified. Time is not freely available but is a limited resource and one that must be ‘paid for’. TIME IS MONEY is thus the superordinate concept that necessarily entails the subcategories of TIME IS A LIMITED RESOURCE and TIME IS A VALUABLE COMMODITY. We think of time then, in terms of money.

The above interchange between researcher (T) and subject (P) demonstrates this metaphor in action both conceptually and linguistically. The metaphor is introduced by the researcher but the subject clearly demonstrates his comprehension of it. Figurative language does not cause communicative difficulty. He answers the question appropriately. Furthermore, shortly after this interchange, the subject employs another linguistic expression himself which is underpinned by the same TIME IS MONEY metaphorical concept.

P: I do say this. one hour a day is not enough for treatment. in my opinion. it seems [lost] . . . . with going to the dentist i missed i missed Wednesday so . i i was down two hours in two days . well it ehr i've lost that . that's what i can't understand why i lose it . and you don't get none at weekends

Therapy is measured in units of time and the more time one gets the better. Time, like money, can be of an insufficient amount and it can be lost and withheld. Our everyday experiences of money are mapped on to our everyday experiences of time. The metaphorical concept thus shapes the way we experience the world.

As Lakoff and Johnson explain though, time does not have to be shaped in this way. TIME IS MONEY is not a universal way of experiencing time but is one that is culturally determined. Time may be in fact be experienced and conceptualised in a variety of ways and a society will not necessarily employ only one of these. For instance, in our society time is also conceptualised in the following ways: TIME IS A MOVING OBJECT and TIME IS STATIONARY AND WE MOVE THROUGH IT (Lakoff and Johnson 1980:42-43).

The RHD subject demonstrates an awareness of this. He is not therefore tied to one conceptual time metaphor. The following linguistic expression demonstrates the TIME IS A MOVING OBJECT conceptual metaphor:

I've lost track of the days somehow

The same data sample also yielded a number of metaphoretic linguistic expressions that are underpinned by the LIFE IS A JOURNEY conceptual metaphor. We conceptualise life as a journey. There are clear starting and finishing points, and within these there are separate stages which also have starting and finishing points. There were 25 such linguistic expressions used by this subject alone. A selection is detailed below:

they let me set off with a weighting engineering firm  
he set me on again 
I I started . I had to i were doing a little job 
well after the war I should have stopped where I was at  
he got me stopped  
and I went right to end, end of month financial year to get me bonus  
I had to pack up 
I flopped at finish

Normal everyday interaction, such as the conversations between the researcher and RHD subjects in this study, rely heavily on both figurative language and figurative thought. An absence of metaphor in interaction would constitute abnormal language and would most likely lead to communicative difficulty.

The last data sample presented here, details part of the conversation between subject 2 and the researcher. All instances of metaphoric language have been highlighted.

6.2 Subject Two
T: So do you remember much about being ill?
P: Yeah
T: What happened?
P: I just had headache and it got stronger and stronger . I went to bed and I thought to myself its gonna pop this and I'm gonna die . And as soon as it hit me I know what had happened so me husband went and phoned ambulance . And I said I'd get, I were, I cried more because I tried to get out of bed and you know like one of them kiddies toys what you push and it shoots back well it was just like that . when I tried to get on me left hand side I rolled on to me right hand side. And well as I say I know what had happened and when I got to hospital I told him and he, it were way he said it "Oh yes Mrs **** you have had a stroke but one thing in your favour is your age" but I cried for two days then I thought well gonna carry on like this might as well be six foot under and I come to terms with it and I've been, I mean I've goal, I've set myself a target for January to walk properly . They say its wrong but it in't because if i don't walk properly i won't be disheartened because I'm satisfied way i walk cos when you look at some of them, some of them'll never

7. CONCLUSION
Analysis of the full data set is underway but these preliminary findings strongly suggest that to label RHD subjects as having a metaphoretic deficit is erroneous.
Conventionalised metaphoric linguistic expressions are by necessity underpinned by conceptual metaphors. Their existence in RHD subjects' output must not therefore be ignored when considering whether or not a non-literal language deficit exists in this population. Furthermore, although full categorisation and quantification of the data will further illuminate the ubiquity of metaphor in this subject group's output, the most important finding of the study will not be the method of data measurement. Instead, the key point raised by this study is that evidence of metaphorical language and metaphoric thought can be found in the RHD population. The acceptance of this finding must call into question the validity of the findings of the neurolinguistic literature that identifies a non-literal language deficit in this group.

8. DISCUSSION

There is an on-going debate across many academic disciplines regarding the place and function of metaphor in both the linguistic and conceptual system. The cognitive linguistic literature claims 'the locus of metaphor is not in language at all, but in the way we conceptualise one mental domain in terms of another' (Lakoff, 1993.203). This view receives strong support from experimental work with normals which is documented in the psycholinguistic literature. This view however, cannot yet be reconciled with the findings of the neurolinguistic literature that maintains the existence of a divide between literal and non-literal language usage. Winner and Gardner, for instance, defend the literal - nonliteral distinction by asserting that there are 'two levels of understanding ... and the distinction between what is literal and nonliteral discourse ... rests on the relation between what is said and what is meant' (1993:425).

The greatest barrier to resolving the metaphor question however, lies in actually establishing what constitutes metaphor. Much of the neurolinguistic literature is solely concerned with an investigation of novel metaphor usage. Certainly literary theory remains preoccupied with novel metaphor and pays only scant attention to linguistic expressions that are conventionalised in the language system.

It may be suggested therefore, that with regard to the asserted metaphor dysfunction in right hemisphere damaged subjects, one only has to replace the term metaphor with novel metaphor to resolve the issue. This will, however, only take us so far.

RHD subjects' ability to participate in everyday interaction remains problematic for the assignment of non-literal language dysfunction. The cognitive linguistic view asserts that metaphor is not only ubiquitous in all language but that both novel and conventionalised linguistic metaphors are underpinned by figurative modes of thinking. It would thus not allow for such a dissociation of ability. The question of metaphor not being ground in language but in thought is therefore not resolved by this.

In conclusion, the findings of this paper call into question the assignment of a metaphor deficit in the RHD population. The neurolinguistic literature to date has focused almost entirely on comprehension and has largely failed to draw a distinction between novel and conventionalised metaphor. Furthermore, an agreement on terminology and its corresponding meaning must be achieved across academic fields so that comparisons and conclusions may be drawn.

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METAPHOR IN DESIGN DISCOURSE

Richard Coyne; Dorian Wiszniewski; Hoon Park
Department of Architecture
University of Edinburgh
20 Chambers Street
Edinburgh, Scotland, EH1 1JZ
Richard.Coyne@ed.ac.uk; Dorian.Wiszniewski@ed.ac.uk; hoon@caad.ed.ac.uk

Abstract

In this paper we identify three theories of metaphor and discuss their utility in the context of design. We make reference to architectural design, but extend the discussion to the design of computer systems and cognitive models of design. We discuss the comparison theory, the interaction theory, and poststructuralist theorising about metaphor. Each theory seems to open up different possibilities in how we reflect on design, and in how it is taught and practised. We refer to some findings of a study into metaphor use by designers working with computers.

1 Design and Comparison

Designers of buildings and other structures have often flirted with the theme of metaphor, more usually through the trope of simile: the Guggenheim Museum in Bilbao is like an unfolding flower (the galleries radiate like petals); the new Scottish parliament building is like upturned boats (in terms of its shape). The conventional view of metaphor in relation to buildings trades in concepts of metaphor as simile or comparison, a variant of the view that the metaphorical can always be substituted by a series of literal statements (Searle, 1988). It also assumes that it is possible to identify the attributes of the things being compared, as if they pre-existed the comparison. The conventional view also deals in concepts of correspondence, as though architecture as a system of signification involves mappings between building attributes (such as shape) and other objects (literal correspondents). It also deals in the distinction between figurative and literal language, as though there is a kind of architecture that is flamboyant, excessive and hence metaphorical, to be contrasted with a more sober, functional and hence literal kind of architecture (as the early modernists contended).

There are parallels here between architecture and computer systems design. When iconic computer interfaces were being developed, many saw the use of metaphor as leading to a kind of excess (Kay, 1990). The literal language of computing is about low level programming and command line interfaces. The metaphorical aspects of computing pertain to visual interfaces, and elaborate comparisons between computer functions and everyday objects. At best, metaphors serve as an expedient to aid learning, enabling us to see unfamiliar concepts (files, directories and deletion buffers) in terms of familiar objects (sheets of paper, folders and wastepaper baskets). At worse such metaphors mislead: after all, how useful would it be if we expected the wastepaper basket on the desktop to behave in every respect as an actual wastepaper basket?

In so far as this comparison theory of metaphor has currency in architectural design discourse it serves to reinforce long-standing architectural divisions, between a systems view of the design process, with its appeal to methods and procedures for design (a literal view), and a romantic view of design as requiring inspiration, genius and the free flight of the poetic imagination (a metaphorical view). In terms of architectural education, there can be a kind of “schizophrenia” in play, where each approach is taught, but each claims universality. Similar dualities are evident in the world of computing (Coyne, 1995, 1999). On the one hand there is the science and engineering of computer systems, the literal aspects of computing, then there are the reflections of some in the HCI (human-computer interaction) community whose appeals to particular metaphors place them in a position that could readily be construed as poetical, if not overtly romantic (Laurel, 1991; Turkle, 1995). The romantic imagination reaches full flight in the reflections of theorists of cyberspace, with talk of digital ecstasis (Rushkoff, 1995) and the transformation of all human thought into a unitary sphere of knowledge (Moravc, 1988). The comparison theory of metaphor also supports the view that there is an essential science of computing on the one hand, opposed to the theories that develop around its use, computer culture, on the other hand, with each having very little to contribute to the other.
We have glossed over most of the distinctions within the comparison view, and conflated several theories into one. In our experience, the comparison view and its siblings do not generate a great deal of interest in design. If metaphor is simply a stratum of linguistic elaboration above the literal, then one may well dismiss metaphor study as a diversion. Architectural study and the study of computing are well served by focusing on the substratum, the literal.

2 Interaction Theory & Design

By way of contrast, Black’s (1988) interaction theory of metaphor elevates metaphor to a subject of substance. For Black, the attributes of the two terms of a metaphor (“building” and “upturned boat” in “building as upturned boat”) emerge in the context of the comparison. It occurs to us to think of the particular building as having shape, a top and a bottom, a curved profile and a strong ridge line, when seen in the context of a boat. Similarly, it occurs to us to think of a boat in terms of its hull shape, orientation and enclosure, when placed in the context of the consideration of a building. Furthermore, for the interaction theory, it is not necessary to conceive of attribute lists for the metaphor to have its effect. Extending Black’s insights, a statement in language is metaphorical before it is reduced to correspondences. The putative correspondences simply invoke other metaphors, until we perhaps reach comparisons best understand as “dead metaphors,” metaphors that no longer provoke our interest, such as seeing the shape of the roof as the shape of the hull. The interaction view also allows that metaphors can be indeterminate, with scope for debate and contrary interpretations. Is the upturned boat metaphor simply about shape or about abandonment, remoteness or transience?

The interaction theory of metaphor has many corollaries for architecture. If metaphor is ubiquitous in language, with the concept of dead metaphor replacing that of literal language, then metaphor is clearly a worthy study in architecture. With it we can be claiming access to something consequential in understanding design. That there are conspicuous metaphors in architecture (building as upturned boat) should not deflect us from the fact that the language of method, process, function and system in architecture is also metaphorical. Here metaphor theory grants us license to re-think the conventions. This is a common theme in Lakoff and Johnson’s (1980) and Schön’s (1963, 1988) writing. When we recognise the metaphorical status of certain reflections and rethink the situation through a different field of metaphors to those to which we are accustomed then there is scope for invention. In the same way that the metaphor dialogue as war (Lakoff and Johnson, 1980) has gone largely unnoticed as a metaphor, and has not served well the cause of conciliation, we could argue that the metaphors of building as circulation, building as overlay of systems and building as geometry have limited applicability. In teaching, and in practice, design seems to flourish in the context of changing metaphors, which amount to switches in frames of reference and reflections on conflicts between metaphors. In this there is also an issue of the authority of different metaphors in certain contexts. Not all metaphors are equal in every situation, and the education of an architect involves the acquisition of a language, which is to say a repertoire of metaphors.

The interaction theory of metaphor brings architecture into close contact with computing through concepts of media. Designers use computers for visualising and documenting building proposals. For the comparison theory of metaphor the link between design and media is somewhat inconsequential, with media serving merely as a means of communicating intentions, giving literal expression to design thoughts. For the interaction theory, the medium of design serves as a productive source of metaphors. According to Schön and Wiggins (1992), design involves the process of seeing as, a metaphorical operation, and the tools and media we use are implicated in how we see. So in the most obvious way, to design with pencil and paper invokes modes of seeing in terms of lines, angles, geometry and flat planes, which some argue have been instrumental in the orthogonal character of most building, and the priority given to plans and elevation treatments. To design using the medium of clay clearly invokes other modes of seeing, and results in different forms of architecture.

In a recent study by Park et al (1999) of designers using CAD (computer-aided design) and 3D modelling systems, it became apparent that the computer takes over and reinforces certain metaphors. According to a participant in the interview study, “once you’ve made your [computer] model you can go to wherever you want, and get that view instead of spending a day doing a drawing of that view.” Here the metaphor of journey holds sway, a common metaphor of design thinking (progressing from a start state to a goal, or embarking on a quest), but also here as a metaphor of interaction. The manipulation of a CAD model entails moving around to gain different prospects from different vantage points. The computer is also commonly described in terms of how it enhances or inhibits freedom of movement. You are working within a particular space: the bigger the space, the greater the freedom: “You’re fixed to your screen, but with the drawing board you’re much freer, in a much larger space.” On the other hand with the computer you can be isolated and constrained:
“You are working more focused and alone.” Another potent metaphor is that of the game. According to one participant, “play, I think, is a very productive metaphor for design and for teaching design, because in play you make your own rules and there are no failures.” Light provides a further metaphor. CAD can be a medium of light: “So it is projecting light to you and so you are working with light: lines of light, strips of light, blocks of light and of course there is a set of instruments that mediates this light between you and this light, a set of commands that you are feeding into a machine that orchestrate the patterns of light.”

If, according to the interaction theory of metaphor, the juxtaposition of terms discloses something new, that is not “pre-existing” in either concept, the second term of the metaphor is also informed by the first. So the metaphor of CAD as a medium of light, says something about CAD, but it also informs concepts of light. Light is something that appears in strips, can be mediated, orchestrated and patterned. So the interaction theory resonates with the way designers think about computer media, and provides useful ways of reflecting on the design process. Design teaching practice is well served by providing environments in which metaphors can do their work, which involves exposure to: a variety of tools and media (including computers); discussion forums (sharing metaphors); a variety of expert opinion and tuition that is able to make productive play of shifting metaphorical orientations.

3 Poststructuralist Theory

The interaction theory of metaphor resonates with theories of language developed in structuralism, and its successor poststructuralism. Poststructuralism has currency in design schools and in cultural studies, initially through its aspiration to account for all practices (and disciplines) as cultural systems and hence language systems (Jameson, 1972; Giddens, 1984). But the main appeal of poststructuralism comes through its exaltation of the concepts of difference, rather than similarity, in the study of language. So spoken language operates as a system of differences, according to Saussure (1983), ideas taken up by Lévi-Strauss (1977) and translated into design discourse through concepts of opposition. Here language theory converges with surrealism in art (Breton, 1978) and the political commentary of critical theory (Benjamin, 1969). Design schools have been influenced by the surrealist concept of the strange juxtaposition: taking objects from one context and moving them into another to invoke contrast.

To use a simple example, in structuralist terms a building can be construed as involving a series of differences, between inside and outside, public and private, service and served, clean and unclean, male and female and so on. Following the deconstructive theme of Derrida (1976), the oppositions entailed in any design concept involve privileging, the identification of which provides the designer with the opportunity to subvert the opposition in some way. In the process something new emerges. So, designing a house in such a way that you have to enter through the bathroom (subverting the usual priority of public over private) would produce a different kind of house, and a different kind of bathroom. In this mode, designers are not necessarily being incited to anarchic subversion of convention, or simply to shock, but to engage in a productive play. From the poststructuralist account design always has this character, though sometimes we can bring this to the fore in ways that are obvious, and pedagogically interesting.

The theme of difference reflects the theme of metaphor in a way that is more radical than suggested by the interaction theory. Put in another way, poststructuralism trades in a language of subversion, rupture, dislocation—a language which resonates with the temperament of many design schools. From a poststructuralist position, metaphors throw up differences. For Ricoeur (1977), metaphors entail a tension between “is” and “is not,” or truth and falsity. To say “the building is an upturned boat” is to invoke a literal falsity, as buildings and boats belong in different categories. But for Ricoeur metaphors are productive precisely because they mis-classify. So metaphor starts from the position of breaching categories. A metaphor also brings to mind its negation, and a tension, as evident in concepts of the computer screen as paper. If the computer screen can be treated as paper, one of the metaphors informing the development of word-processing and computer-aided design systems, then it is also unlike paper. And it is on reflecting on the unpaper-like qualities of the computer screen that systems developers have been led to innovative designs. The screen is paper with adjustable transparency, where you can turn words into hyperlinks and include animated images.

We were able to identify the play of oppositions in the CAD study referred to above. Light is contrasted with darkness, play with work and freedom with constraint. The computer also presents on the issue of a barrier between the inside and the outside. Traditionally, this barrier is the computer screen. According to one CAD user:

There’s a sense with digital media of a window or wall between you and the representation. You are having to create something on that side of the window, but you can’t actually get hold of it directly. According to another participant, the challenge is to break the barrier, to “melt this piece of glass and go inside, and take things out, and put things back inside.”
The paper metaphor seems to be inadequate to the task of accounting for what happens when designers use computers. The difference discloses the concept of a world behind the screen, another powerful metaphor, the negation of which generates other metaphors. So for poststructuralism, metaphors are related to each other in complex and fluid ways as they undergo revision in the context of new technologies and practices. In turn, such technologies and practices are conceived and constructed in the light of the metaphors disclosed. Good designers also seem able to stretch metaphors to the limit, to invert and subvert them.

4 The Practical Difference

We have outlined the practical implications of three major theories of metaphor on design, including the design of computer systems. But what of the study of computing and the mind of the designer: the contribution of cognitive science? The comparison theory supports the expectation that metaphor, as an important component of language, can be modelled, and the workings of language can be automated as symbol systems.

But, in so far as cognitive science is concerned with modelling and automating language function (or the design process), the interaction theory frustrates on two fronts. First, the closer a theory of language moves to a dependence on concepts of context, the further it moves from the assurances offered by grammar and theories of correspondence, the mainstay of systematic models and design method. Second, the interaction theory provides a highly reflexive theoretical frame, that renders its own theories subject to scepticism (as in the comment that to appeal to metaphor is simply to see everything through the metaphor frame, which is grist to the mill for a theory of rhetoric). But more importantly, the interaction theory places the pursuits of cognitive science within the metaphor frame, and opens them to question, questions that the systems theory of cognitive science has difficulty addressing: what are the motivations for and the entailments of the mind as machine, communication as conduit (Reddy, 1988), mind as society, mind as container, design as search and thought as information processing? On the other hand, connectionist theories of cognition seem to support an interactionist view of language and memory (Coyne and Yokozawa, 1992), though connectionism seems to suggest that the interesting questions that cognitive science has set itself are basically questions of microbiology, according to Dreyfus (1992).

Though it has application in design, the language of difference, poststructuralism, seems to elicit little following from cognitive science, and hostility in some quarters (Sokal and Bricmont, 1998). The language of difference invokes a language of indeterminacy, which is of little comfort to those interested in predictive models. From a poststructuralist perspective much cognitive science represents a dalliance with the literal. If this is so then the interest for the poststructuralist resides in the breach, the gap, between metaphorical truth and literal falsity: the gap between the method and its application. What is left out of the models is of greater interest than what can be included in them. Here we encounter what can be accounted for in Kuhn’s (1970) terms as an incommensurability of paradigms, or in metaphorical terms, an irreconcilable clash of metaphors.

References


Translating the Untranslatable. A Machine Translation Approach to Dealing with Metaphor

Michal Harasimiuk*, Piotr Twardzisz$^\dagger$

*CGLabs Ltd., UK
mh006@post.almac.co.uk

$^\dagger$Department of English
Maria Curie-Skłodowska University
Lublin, Poland
pettar@klio.umcs.lublin.pl

Abstract

In our paper, we present a study of metaphor in the Machine Translation context and describe the general strategy and practical methods in which our MT system handles metaphors. In particular, we seek to detect, analyse and exploit the cross-language metaphor availability. We support our study with examples gathered during our work on the English-to-Polish part of the system. More of the examples for other language pairs, together with our corpus studies will be posted on the Internet on http://www.uhc.lublin.pl/metaphor.

1 Introduction

Before we can explain our methodological and computational approach to metaphor, we have to introduce the basic assumptions on which our entire work is based.

1.1 Existence of literal and metaphorical

Our first and most important assumption is that metaphor and indeed whole of the language can be perceived in literal terms. Literal language provides means of establishing categories to describe the natural world in common terms that can be universally comprehended. Metaphorical language uses literal language to create new ways of perceiving and understanding the world and involves a conceptual process different from that of literal description.

The existence of literal language as distinct from metaphorical creates a common objective standpoint from which any investigation into syntax, contexts and finally metaphors can be commenced. After Mac Cormac (1985) we take the view that metaphor can be analysed on three overlapping levels:

- Level 1: Surface Language
- Level 2: Semantics and Syntax
- Level 3: Cognition

Such independence of literal language from the cognitive process of metaphor enables us to employ a chain of computational steps, leading from syntactic decomposition of the source text to identification of metaphor and finally, its transfer into the target language without reaching beyond level 2. The responsibility for the cognitive aspect of metaphor was moved almost entirely into the design phase of knowledge rules. From the user standpoint, our system seeks to preserve the information carried by the literal language and required to perform cognitive analysis of the metaphor rather than attempt to deduce the actual meaning of the metaphor.

1.2 Partial rejection of Linguistic Relativity

If we were fully to agree with the Sapir-Whorf hypothesis, that the language of an individual determines the world view and the conceptual system of this individual, and, as a result of this, individuals who speak different languages view the world differently owing to different conceptual systems at their disposal, we would lose all the grounds for our work.

While we agree that the complete translation from one language to the other remains impossible since the total understanding of another language requires an immersion in that language with the inevitable change
in thinking, we believe that in most cases languages which emerged from common cultural and environmental grounds can be translated by the machine with the 'sufficient' accuracy.

In particular, with respect to metaphor, we follow the logic of Stephen Pepper (1970) in explaining its deepest origins:

A man desiring to understand the world looks about for a clue to its comprehension. He pitches upon some area of common-sense fact and tries, if he cannot understand other areas in terms of this one. This original area becomes then his basic analogy or root metaphor. He describes as best he can the characteristics of this area, or if you will, discriminates its structure. A list of its structural characteristics becomes his basic concepts of explanation and description.

If one sees metaphor as a cognitive process, embedded in a wider evolutionary knowledge process that combines brain, mind, and culture in the creative formation of language, one cannot but notice that the shared cultural experience and environment must lead to a high degree of metaphorical symmetry between the languages.

1.3 How do we define symmetric metaphor and why is it so important in our work?

In its ideal form, symmetric metaphors are those in which tenor and vehicle belong to the same domains in the source and target language, respectively, and the words, the metaphor consists of, can be translated literally. Such metaphors are numerous, often occurring in the form of dead metaphor such as 'the tip of an iceberg', 'head of a cabbage' etc. Since they are not particularly interesting from the computational point of view, as requiring no special treatment, we have extended the concept of symmetric metaphor into these which, while preserving the underlying metaphorical concepts, differ in the details in which these concepts are conveyed in both languages. Examples from this group may include:

'Eng: to give an idea -> Pol: to push the idea closer'
or
'Eng: it is high time -> Pol: it is the highest time'

Our corpus studies so far, revealed that in about 70% of cases, metaphorical meaning can be transplanted from English into Polish with high degree of confidence.

The reason for our focusing on this phenomenon is that it offers tremendous benefits in cutting the processing time and in many cases eliminates the need for the elaborate sentence tree topology manipulation. We try to preserve as much structural and word-ordering information as possible to avoid risk of misinterpreta-

tion of contexts or other types of ambiguities. At the same time, we take great care not to extend our methodology too far so as not to degrade the system into word-for-word or phrase-by-phrase paradigm. Similarly, we argue against the interlingua approach, which often fails to take advantage of cross lingual symmetries.

2 Linguistic considerations

In this linguistic part of the paper we focus on the semantic complexity of two morphologically divergent language systems such as English and Polish. Firstly, we analyse the complexity of the source language (English). Secondly, the semantic intricacy of the target language (Polish) is highlighted. Finally, the complexity of the translation process is focused upon. Owing to limitations of space, only a fraction of a certain phenomenon has been selected.

The linguistic phenomenon we highlight here has traditionally been labelled as CONVERSION or ZERO DERIVATION. English, a fairly simple morpho-logical system, is prolific with so-called zero-derived forms, such as milk (V) supposedly derived from milk (N), or cheat (N) zero-derived from the verb of the same form. This part of the presentation will heavily draw upon the model of COGNITIVE LINGUISTICS as elaborated by Ronald W. Langacker (1987, 1991). It will be claimed that both the source and target languages are entangled in METAPHORICAL EXTENSIONS exhibiting similar effects which should not be ignored in the translation process.

2.1 Extensions of things to processes

THINGS, defined by Langacker as regions in some spatial domains, are more primitive than PROCESSES, which accommodate things evolving or interacting with one another in complex temporal relations. It takes relatively little mental effort to arrive from a process, which is seen as a complex structure in the temporal domain, to one single element which is part of that process, or, to some segment which is one stage in the whole sequence of several stages (e.g. Joan is a bloody cheat, Let's have a swim in the sea, Tom is a good catch, etc.). The opposite direction of extension must be more intricate because one starts with a more primitive entity and arrives at a complex relation which progresses in time (see the examples below). Also the outcome of this type of extension must be more complicated because the basis of the extension constitutes only one element within the resultant process. There must then be a great deal of mental effort on the part of the conceptualizer who analyses the type of extension under consideration.
2.1.1 Things as potential (non-primary) landmarks of their process-extensions

The list below provides four characteristic examples of the extension under consideration:

(1) (a) Have you salted the soup?
    (b) He varnished the shelf but forgot to sand it beforehand.
    (c) John elbowed his way through the mob...
    (d) Will you hammer the nail for me, please?

The underlined verbs (i.e., processes) are understood here as semantic extensions (i.e., extensions whose phonological import is null) from nouns (i.e., things) which constitute prototypical bases for these zero derived formations. This type of semantic extension can be summarized by means of the following image schema diagrammed in Fig. 1:

![Figure 1](image)

The heavy-line dashed arrow from \( \text{lm}_2 \) towards the process box signals the extension in question. The heavy-line around the process box typically signifies the category which lends its profile to the profile of the entire complex unit, which is a sentence, i.e., a process in this case. Crucial in this complex temporal relationship are the two landmarks, that is, \( \text{lm}_1 \) and, in particular, \( \text{lm}_2 \). The trajector, defined as the primary figure in a relation, corresponds to the subject at sentence level. Landmark, defined as a secondary figure, serves for the purpose of locating the primary figure. Simplifying matters a bit, in sentence (1) (d), for example, the personal pronoun subject you corresponds to the trajector (tr), the direct object (the) nail is the primary landmark (\( \text{lm}_1 \)), whereas the noun hammer, which does not show up at the surface of the sentence (hence the weak line square), corresponds to the secondary landmark (\( \text{lm}_2 \)). Each of the participants of the target schematic process can exist independently, but within the profile of the process they enter into a complex relationship.

**Metaphorical extensions in English**

Needless to say, metaphorical occurrences such as I wonder who hammered such stupid ideas into your head require a further extension between the source and target domains. For one thing, a processual extension (of the type recorded in 1d) obtains between the thing hammer (\( \text{lm}_2 \)) and the process hammer in their prototypical senses. Let us mark this extension as:

\[ [[\text{TOOL}]/[\text{hammer}]] \rightarrow [[\text{TOOL}']/[\text{hammer}]], \]

where the element on the right-hand side designates a processual extension of the thing hammer in the sense ‘tool.’ The dashed-line arrow stands for semantic extension; capitals designate the semantic portion of the entire unit, whereas lower case letters are used for filling the phonological pole of that unit. Additionally, one conceives of the processual extension along the following schematic formula:

\[ [[\text{FORCE}]/[\text{hammer}]] \rightarrow [[\text{FORCE}']/[\text{hammer}]], \]

where one uses the category hammer in the sense ‘force.’ \([\text{FORCE}']\) stands for a processual metaphorical extension of its respective thing in this meaning. The two above-postulated extensions, non-metaphorical and metaphorical, do not obtain independently of each other. One cannot preclude that the thing hammer in the sense ‘tool’ serves as a sanctioning category for the conceptualization of the process hammer in the sense ‘force,’ and vice versa. This unavoidable criss-crossing of sanctioning relations between the above four categories can be diagrammed in the following schematic manner:

![Figure 2](image)

The sanctioning of the above categories appears as a two-way traffic. In particular, the type of extension between the source domain and the target one is of primary importance to us. We propose that the metaphorical extension I wonder who hammered such stupid ideas into your head, although not necessarily generated from the one in (1d), is sanctioned by it, and vice versa. Summing up, a process such as hammer, in whatever sense, reflects a complex temporal relation in which the trajector acts upon the primary landmark by means of the secondary landmark, which itself comprises a complex categorization relationship. Suffice it to say that the above-discussed case of hammer is not by any means marginal in English.
Metaphorical extensions in Polish

The Polish equivalent(s) of the above two English verbal senses of hammer is/are wbiać. The Polish form wbiać is primarily verbal and focuses on the process of exerting force upon some object, typically a nail, as in

(2) Wbij gwoźdz w scianę.

‘Hammer a nail into the wall,’

and metaphorically, on an abstract notion such as an idea, for example

(3) Kto ci wbiać do głowy takie rzeczy?

‘Who hammers such things into your head?’

The verb wbić, as opposed to the process hammer, is not derived from the nominal, that is the name of the tool used for this purpose. Interestingly, both processes, wbiać and hammer, involve the object hammer in their source domains, though the Polish wbiać to a lesser extent as the object is not conventionally sanctioned at clause level the way it is in English. Nevertheless one cannot conceive of the process wbiać in its primary sense without the existence of the thing hammer in the background of this process, and without the extension of hammer in the sense of ‘force’ in the case of metaphorical wbiać.

2.2 The complexity of cross-linguistic semantics

We have assigned the status of lm₂ to the thing hammer, in both languages, to simplify matters, although more appropriately the profile of the thing hammer should correspond to lm₁, as lm₁ should be reserved for the recipient of lm₁ (a nail prototypically or stupid ideas metaphorically), that is into the wall and into your head, respectively. For the sake of brevity, we ignore a potential lm₃, in order to focus on the very relation that obtains between the main participants of the four (two prototypical, and two metaphorical) processes in the two languages.

We observe that in the two languages a metaphorical extension takes place, which originates in the prototypical process. Neither language seems to sanction the addition of the noun hammer (or its Polish equivalent młotek) to any of the above processes as that would pose redundancy avoided under normal circumstances (cf. Does he drink?, I don’t smoke vs. Does he drink alcohol?, I don’t smoke cigarettes). Idealizing our data somewhat, we can risk the claim that the kind of metaphorical extension present in the two divergent languages is the same as we envisage exactly the same scenes with the same participants in the prototype and the metaphorical extension. The only perceivable difference between the two languages in this respect is that in English the role of lm₂ (i.e. the thing hammer) is additionally highlighted owing to the fact that the non-metaphorical semantic extension (diagrammed in Fig. 1) does take place between the thing hammer and the process hammer. The thing młotek ‘hammer,’ which also functions as lm₁ in Polish, does not receive that much focus as hammer in English. That is because there is no equivalent of this non-metaphorical semantic extension in Polish between młotek ‘hammer’ (N) and the non-existent verb *młotkować which is pre-empted by the attested verb wbiać ‘hammer (V)’. Despite lack of phonological correspondence between the Polish młotek (N) and wbiać (V), similarly to the English pair hammer (N) and hammer (V), Polish also exhibits a metaphorical extension between wbiać (in its literal sense) and wbiać (in its metaphorical meaning).

Having analysed two tiny fractions of two divergent language systems, we observe that, first of all, a similar metaphorical effect takes place in the two languages. Furthermore the two lexicons exhibit surprisingly similar connections between the sanctioning and target categories. Despite the weak semantic import of the nominal source domain in Polish, as opposed to that in English, the Polish nominal młotek cannot be ruled out from the literal and metaphorical processual extensions.

This leads us to the conclusion that in order to arrive at an adequate description of metaphorical extensions in the two languages, which are to serve as a theoretical background for research in MT, one cannot ignore the complexity of the semantic inter-relationships among the categories involved and their numerous senses which contribute to the entire semantic network, which is truly encyclopedic in character.

3 Computational part

3.1 The architecture

We will not attempt here a detailed description of the system architecture. Rather than that we will provide an overview of the entire system and focus on the parts, which are either responsible for or evolved as a result of an analysis of metaphor.

The operation of the system relies on, what we have termed a ‘parallel micro-agent co-operation’. Our goal was to minimise the amount of centralised processing, inherent in the typical rule based systems. Instead, practically all of the linguistic processing is performed at the lowest - internal, word level. The first stage of the process is to bind micro-agents with words. Micro-agents acquire all the knowledge that can be deduced from syntax and semantics. In the following stages they start exchanging and transferring linguistic information by means of events. In case of more complex grammatical or meaning disambiguation problems,
global agents are invoked as necessary when the knowledge available to 'internal' rules is insufficient.

The translation process begins generally at the sentence root and is propagated via inter-word links to other parts of the sentence graph in the left-to-right manner. Links, forming the sentence tree act as filters for the events. Depending on the link type, certain events may be inhibited, passed through and propagated or modified. The whole process is semidendrastic. Although the order in which rules are executed is fixed by the sentence tree topology, rules can set triggers which when certain conditions are met, cause the rule to fire again.

3.2 Identifying and translating the metaphor

After this introduction let us examine how each of the conceptually distinct parts of the system contributes to effectively dealing with metaphor. It is important to say that except for the preprocessor, none of these subsystems can be isolated from others - during the translation they all work together in a highly unison and parallel fashion.

3.2.1 Preprocessor

Preprocessor deals with what we have described as Level 1: surface language. The aim of preprocessor is to identify and mark all of, what Lakoff and Johnson refer to as 'dead metaphors' or metaphors that entered the language and became fixed part of it. The examples of such expressions include: "head of a list", "leg of a table", "foot of the mountain", etc. Preprocessor removes them from the source text and substitutes meta-words in their place. Meta-words will be recognised by later parts of the system and the appropriate translation will be produced.

3.2.2 Parser

Our current version of the system uses the Link Grammar parser. (Slator, Temperley, 1996) Its conceptual simplicity and elegance, high level of reliability and scalability made it a very good choice to provide us with an entry point into further linguistic examination. Moreover, the underlying idea of Link Grammars is coherent with the overall design of our runtime system, in that LG is word-driven. Each of the words is assigned a set of + and - connectors, linking to the right and left respectively. Given an ordered collection of words (sentence), the system attempts to link the words together so that certain global rules (planarity and non-crossing) are satisfied and...

When the metaphor is symmetric between the languages, this amount of information is sufficient for its successful translation. Consider for example sentences:

- Will you hammer the nail now?
- Who hammered these ideas into your head?

Since as we have described in the theoretical section, both in English and Polish the same extension of THINGS to PROCESSES takes place in the metaphorical as well as in the physical domain, the only required information the system needs in order to translate the sentence (metaphorical or not) is the Part of Speech for 'hammer'.

As our second case study, consider the sentence:

- We are out of trouble.

Although the metaphor TROUBLE IS A CONTAINER is also available in Polish, the phrasing of the above sentence seems at first untranslatable in a direct manner. One might attempt a transformation into less metaphorical TROUBLE IS A PROCESS, which would yield:

\[ \text{--------------------Xp--------------------} \]
\[ \text{-------------------PP---} \]
\[ \text{+---Wd--Sp+} \quad \text{+IDP--Jp--} \]
\[ \text{--------------------} \]
\[ \text{\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\]
try of this metaphor. Marked words represent the approximate back-translated meanings of the constituents of the Polish expression "wybrac tarapatow".

3.2.3 Semantic module
Despite a high degree of metaphorical coherence between English and Polish, large numbers of cases defy the syntactic analysis and force us to resort to the semantic information. Since these two aspects of grammar are entwined, the semantic module is invoked by word-agents as soon as the scheletal syntactic parses have been generated. Scheletal parses provide us with hypotheses as to possible linking relations between words. These hypotheses are tested by micro-agents against our semantic network, on a strictly need-to-know basis. This constraint prevents symmetric metaphor agents from consuming processing time and reaching the erroneous conclusions should the semantic network be incomplete.

To store the semantic data, we employ rich ISA hierarchies onto which we superimpose vectors representing the possible metaphorical links between words or concepts. The semantic space achieved in this manner represents a very large number of semantic dimensions any given word can take. This is similar to the approach proposed by Earl Mac Cormac (1985). In contrast to his work, we do not introduce the length of the vector between two words to determine how closely they are related. Our vectors provide only YES/NO metaphorical linking of semantic subspaces unrelated in literal sense.

Our metaphorical vectors can also be switched on and off. This option provides us with a convenient and effective way in which to identify metaphorical utterances. It is used exclusively in the design time, to enable automation of the selection process of candidate metaphor-creating words. This mechanism follows the established theoretical explanation of metaphor, that the combination of referents that produces semantic anomaly, forces the hearer or reader of a metaphor to locate the similarities and dissimilarities among the attributes of these referents. Our system reports such anomaly if the mapping between words in the syntactic space (as created by the parser) cannot be reflected in the semantic space.

To illustrate the process of invoking the semantic knowledge during the translation, we will consider the INSTRUMENT IS A COMPANION metaphor, which is not available in Polish. The fact that ACTION and INSTRUMENT are related is conveyed only by CASE rather than by the preposition 'with'. The responsibility for dealing with this metaphor is assigned to 'with'. It is the presence of 'with' micro-agent that will invoke rules trying to establish the context in which it is used.

We will replicate the steps required for translation of the sentence:

*He smashed the window with a hammer.*

The parser generates the following two possible syntactic interpretations of this sentence, and orders them according to the empirical cost of link types used:

```
+--------+   +--------+   +--------+
| Xp     |   | Os     |   | Js     |
+--------+   +--------+   +--------+
| Wp     |   | Da     |   | Da     |
+--------+   +--------+   +--------+
/// he.p smashed.v the window.n with a hammer.n
```

```
+--------+   +--------+   +--------+
| Xp     |   | Os     |   | Js     |
+--------+   +--------+   +--------+
| Wp     |   | Da     |   | Da     |
+--------+   +--------+   +--------+
/// he.p smashed.v the window.n with a hammer.
```

In the first sentence, the presence of the MVP link (verb-preposition) invokes a semantic check, whether the action conveyed by the verb can be classified as manipulative (hitting, eating, smashing as opposed to talking, walking etc.). The second check involves analysing the semantic markers for the noun pointed to by the Js link. If the resultant noun is animate or the verb is non-manipulative, the COMPANION interpretation is chosen. If the noun is inanimate and the verb - manipulative, the sentence is interpreted as INSTRUMENTAL and 'with' is hidden.

The second sentence may potentially represent metaphors PART IS A COMPANION or FEATURE IS A COMPANION (as in 'a pistol with a hammer' or 'a window with a view') both of which are symmetrical, hence the only processing required is to check the possibility of semantic associations between the two nouns. In this case, the result of the check is negative and the entire sentence parse is rejected.

4 Corpus based examples
A significant number of basic metaphors, especially in the orientational group (GOOD IS UP, MORE IS UP, BAD IS DOWN), metaphors grounded in the physical

---

1 Consider for example the sentence 'Buses are on strike.' The metonymy OBJECT FOR PEOPLE RESPONSIBLE is also available in Polish and it does not require any special treatment. If we tried to analyse it semantically, an additional level of complexity would arise through the need of ascribing human attributes to a certain class of nouns. Since, thanks to symmetry, we do not have to do it, we cannot allow for the semantic module to be invoked automatically.

2 The symmetry of the FEATURE IS A COMPANION metaphor may be broken in expressions like: 'a window with a hammer next to it'. We have made this simplification not to distract us from our main metaphor and because the literal translation of this more complex case, although not perfect, may be accepted. These are unfortunately typical compromises, with which we are faced, when developing our commercial MT system.
experience (FIELD OF VIEW group, SEEING/LIGHT IS UNDERSTANDING, CONTAINMENT group) are shared not only by English and Polish but most of the European languages. While the surface language implementation of metaphors may differ, the underlying cognitive aspects remain common. Exhaustive corpus studies can be found on our website: http://www.uhc.lublin.pl/metaphor.

Even greater symmetry can be observed for more complex, sophisticated or novel metaphors. In The Sunday Times Business section (6 Feb 1999) we read:

Companies that have clowns in the boardroom and directors who walk the tightrope typically keep their figures hidden away.

The MT system attempting to untangle this metaphor, would obviously use the knowledge about the associations between clowns and incompetence or failure and tightrope and risk-taking or having a limited choice of options in decision taking. The resulting translation might look like: 'Companies, that have incompetent members of the boardroom and whose directors have to operate on the very tight financial margins, keep their results hidden away.' This would be a perfectly viable approach had it not been for the second part of this sentence, in which we read:

- but not Cirque du Solei, the Canadian dance troupe now on tour in London.

In the following paragraphs we learn that the Cirque du Solei is a hugely successful company - and our attempt at the Level 3 analysis not only removed the humour of this sentence but introduced false information. The extent of the symmetries of the CIRQUE metaphor into the business world is even wider. One can 'juggle the capital', 'try to keep the balance' and if things go wrong, 'a fall can be very painful'.

One might argue that such examples are artificial and rare, we on the contrary believe that they best illustrate the very reason for using the metaphor. They enrich the language and create a unique bond between the author and the reader.

5 Summary and future work

We regard metaphor as the primary target setting the direction for our research in Machine Translation. Considering metaphor as one of the most complex phenomena in language, we use it as the main test for accuracy and usability of our algorithms. The assumption is that once correct for metaphors, our methods will scale well into simpler and less demanding cases.

It is not always easy to find equivalent metaphors in the target language, but with some creative effort from the system designers - possible in large number of cases. This is, on the one hand, very encouraging since the richness and flexibility of languages in itself provides us with methods for exploiting the cross-lingual coherence; but on the other hand, it complicates any attempts of automated construction of MT dictionaries and ontologies. Each word rule has to be handcrafted, analysed and tested in a variety of contexts. While we believe that the trade-off between the development time and the translation quality is worth taking, one of our main research goals lies in devising ways of automating this task.

Acknowledgements

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The Handling of Metaphor in Internal Matching Pragmatics

Roland Hauser

Universität Erlangen-Nürnberg
Abteilung Computerlinguistik (CLUE)
rrh@linguistik.uni-erlangen.de

Abstract

This paper analyzes the metaphoric use of language symbols in analogy to the nonlinguistic pragmatics of using a tool. The basic mechanism of natural language communication is analyzed as an internal matching between the signs' literal meaning and the contextual referents, based on the principle of best match. An important precondition for successful reference is thereby the delimitation of potential referential candidates in the speaker-hearer-internal context of use. This delimitation is based on the STAR-point, i.e. the parameters of the sign's origin. The pragmatic hierarchy of language use presented in conclusion is compared with a task of nonlinguistic pragmatics, whereby the different types of use are explained as a way to overcome the inherently limited choice of words for an unlimited variety of referents.

1 Using an organon

A theory of nonlinguistic pragmatics must describe the structure of the tools, of the objects to be worked on, and the user's strategies of applying a tool to an object in order to realize a certain purpose. Analogously, a theory of linguistic pragmatics requires an explicit definition of literal meaning (tool), of the interpretation context (object to be worked on), and of the strategies for relating a literal meaning and a context such that the intended speaker meaning is communicated. Just as a tool is positioned in a specific spot of the object to be worked on and then manipulated in a purposeful way, a suitable literal meaning is positioned relative to a certain internal subcontext in order to represent it linguistically (speaker mode) or to insert it into the subcontext (hearer mode).

2 Internal matching pragmatics

In the SLIM theory of language, the utterance meaning \( \text{meaning}_2 \) is defined as the use of a literal meaning \( \text{meaning}_1 \) relative to a context of use. Reference is modeled as an internal matching procedure between the meaning_1 of language (types) and corresponding contextual referents (I-concepts). This procedure is illustrated in 2.1 with the sign type symbol, whose meaning_1 is defined as an M-concept.

2.1 COGNITIVE 2+1 LEVEL ANALYSIS OF REFERENCE

<table>
<thead>
<tr>
<th>surface:</th>
<th>square( _\text{sym} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>edge 1: ( \alpha _\text{cm} )</td>
<td></td>
</tr>
<tr>
<td>angle 1/2: 90°</td>
<td></td>
</tr>
<tr>
<td>edge 2: ( \alpha _\text{cm} )</td>
<td></td>
</tr>
<tr>
<td>angle 2/3: 90°</td>
<td></td>
</tr>
<tr>
<td>edge 3: ( \alpha _\text{cm} )</td>
<td></td>
</tr>
<tr>
<td>angle 3/4: 90°</td>
<td></td>
</tr>
<tr>
<td>edge 4: ( \alpha _\text{cm} )</td>
<td></td>
</tr>
<tr>
<td>angle 4/1: 90°</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M-concept:</th>
<th>2 language level</th>
</tr>
</thead>
<tbody>
<tr>
<td>edge 1: 2 cm</td>
<td></td>
</tr>
<tr>
<td>angle 1/2: 90°</td>
<td></td>
</tr>
<tr>
<td>edge 2: 2 cm</td>
<td></td>
</tr>
<tr>
<td>angle 2/3: 90°</td>
<td></td>
</tr>
<tr>
<td>edge 3: 2 cm</td>
<td></td>
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<tr>
<td>angle 3/4: 90°</td>
<td></td>
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<tr>
<td>edge 4: 2 cm</td>
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<tr>
<td>angle 4/1: 90°</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>I-concept(_\text{loc}):</th>
<th>1 context level</th>
</tr>
</thead>
<tbody>
<tr>
<td>edge 1: 2 cm</td>
<td></td>
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<tr>
<td>angle 1/2: 90°</td>
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<tr>
<td>edge 2: 2 cm</td>
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<td>angle 2/3: 90°</td>
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<td>edge 3: 2 cm</td>
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<tr>
<td>angle 3/4: 90°</td>
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<tr>
<td>edge 4: 2 cm</td>
<td></td>
</tr>
<tr>
<td>angle 4/1: 90°</td>
<td></td>
</tr>
</tbody>
</table>

The upper feature structure (type) is called an M-concept because it is used for matching. The length of the edges is represented by the variable \( \alpha \), for which reason the M-concept is applicable to squares of any size.

The lower feature structure is called an I-concept because it instantiates a certain type. The instantiation has edges of length 2cm, whereby the feature \( \text{loc} \) specifies when and where the token was recognized.

The word square is lexically analyzed as a fixed constellation of (i) a surface (here the letter sequence s, q, u, a, r, \( \theta \)), (ii) a category (here the subscript noun), and (iii) a meaning_1 (here an M-concept). The relation of reference between the language level and the contextual

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level is based on matching the type (M-concept) onto a corresponding token (I-concept) - as indicated by the dotted line.

The internal matching is based on the three levels of (i) the analyzed surface (syntax), (ii) the meaning1 (semantics), and (iii) the context. These form a functional (2+1) level structure. The two top levels of syntax and semantics are joined as the '2' in the (2+1) schema, because the mechanism of natural language communication requires a fixed connection between analyzed surfaces and their meaning1. The internal matching of natural language pragmatics, on the other hand, is a flexible matching procedure between the level of semantics (ii) and the level of context (iii), whereby the context is represented by the '1' of the (2+1) schema.

In a robot, the fixed connections between the analyzed surfaces and their meaning1 are established by the designer using a programming language. In humans the analogous connections are established by means of conventions, which each speaker-hearer has to learn (in accordance with de Saussure's first law).

The speaker-hearer may use (the tokens of) the same sign to refer to ever new objects in ever varying situations. Assume that two people land on Mars for the first time and both see a rock shaped like a mushroom. If one says Look, a Mars mushroom!, the other will understand.

This situation provides no occasion to establish - prior to the utterance - an external relation of reference between the spontaneous ad hoc expression Mars mushroom and the intended referent. Thus, any attempt to explain successful reference in terms of an external relation between the signs and the referential objects is unrealistic.

The successful reference of the expression Mars mushroom is based instead on the analyzed word forms Mars and mushroom, available to the speaker and the hearer as predefined, internal linguistic entities consisting of a surface, a category, and a minimal meaning1 (analogous to analysis of the word form square in 2.1). Furthermore, their context must (i) indicate where they presently are, and (ii) represent the same characteristic rock formation in their respective fields of vision.

3 Literal and nonliteral use

The analogy between an external tool, like a screw driver, and a cognitive tool, like the word table, also shows up in the possibility of their respective literal and nonliteral uses. While the 'literal use' of a screw driver consists in the fastening and unfastening of screws, there is also an open multitude of 'nonliteral uses,' such as punching holes into juce cans, use as a door stop, as a letter weight, etc. Because these nonliteral uses depend on the momentary purpose of the user and the properties of the current context of use, it is impossible to provide a valid enumeration2 of all the possible uses (i.e., all the different possible instances of the speaker meaning2 of a screw driver.

Instead, the user infers the most effective application of the tool in each new context of use and for each new purpose via general principles of pragmatics. These refer to (i) the structure of the tool with its known shape and properties of material (constituting the screwdriver's literal meaning1), and (ii) the current properties of the object to be worked on (constituting the 'context of use').

It is similar with a word like table, which may be used not only to refer to prototypical tables. Assume that B is in a room never seen before, in the middle of which there is an orange crate. If A says to B Put the coffee on the table, B will understand that table refers to the orange crate. Given this limited context of use, the minimal meaning1 of the word table best fits the structure of the orange crate (best match).

3.1 Nonliteral use of the word table

![Diagram showing the exchange of information between speaker and hearer regarding the placement of coffee on an orange crate.]

However, if a prototypical table were placed next to the orange crate, B would interpret the sentence differently, putting the coffee not on the orange crate, but on the table.

This is not caused by a change in the meaning1 of the word table, but by the fact that the context of use has changed, providing an additional candidate for best match. This example shows that the respective properties of the current context of use contribute in a major way to the success of reference by means of the meaning1 of a sign.

4 Finding the correct subcontext of interpretation

The subcontext can only be put into effect if it is properly delimited. This is because the principle of best match can only work if the selection of possible candidates is restricted. This leads to a central question of linguistic pragmatics.

How does the speaker code the delimitations of the subcontext into the sign, and how can the hearer correctly infer these delimitations?

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2. This is a problem for the speech act theory of Austin, Grice, and Searle.
Because the internal database of a speaker-hearer comprises all the information accumulated in the course of a life time, each interpretation of language requires correctly finding a small, delimited subcontext of use in a huge database.

The hearer's selection of the correct context of use will now be demonstrated with the example of a postcard -- a complex language sign where the places of origin and of interpretation are usually far apart in time and space. The postcard is read by the 'hearer' Heather on a bench in New Zealand on a hot day in February 1999. It shows the statue of liberty on one side, and the following text on the other:

4.1 POSTCARD EXAMPLE

New York, December 1, 1998

Dear Heather,

Your dog is doing fine. The weather is very cold. In the morning he played in the snow. Then he ate a bone. Right now I am sitting in the kitchen. Fido is here, too. The fuzzball hissed at him again. We miss you.

Love,

Spencer

Like all human artifacts, the postcard (as a hand-written sign) has a point of origin. In signs, this point is defined by the following parameters:

4.2 PARAMETERS OF ORIGIN OF SIGNS (STAR-point)

1. $S =$ the Spatial place of origin
2. $T =$ the Temporal moment of origin
3. $A =$ the Author
4. $R =$ the intended Recipient.

The parameters $S$, $T$, $A$, and $R$ have their values defined automatically during production and constitute the STAR-point of a sign. All meaningful utterances have their unique STAR-point, which is a necessary property of sign tokens.

Apart from of origin of a sign, there are the parameters of its interpretation. The latter are called ST-points, because they consist of (1) a spatial location $S$ and (2) a moment of time $T$. Just as the STAR-point is fixed automatically by the origin, an ST-point is defined whenever a sign is interpreted.

While the STAR-point is unique for any given sign (token) and defined once and for all, the number of its possible ST-points is open. For example, a postcard which is lost in the mail may not have any ST-point at all, whereas a letter published in the New York Times will have many ST-points.

The ST-point is known to each single reader: it equals his or her current circumstances. Yet the correct interpretation of a sign depends mostly on the knowledge of its STAR-point, which may be difficult to infer.

Consider a clay tablet found in an archaeological dig in Mesopotamia. The ST-points of the various interpretations attempts by various scientists make no difference as to what the tablet really means. What is crucial are the place of origin ($S$), the correct dynasty ($T$), the writer ($A$), and the addressee ($R$) of the clay tablet.

Only face-to-face communication provides the hearer with the STAR-point directly. For this reason, the pragmatic interpretation of natural language is especially easy there. In all other cases, the STAR-point must be inferred from the sign and the circumstances of its (token-) appearance. Signs not intended for face-to-face communication must ensure their correct contextual positioning by an explicit or implicit specification of their STAR-point.

The need for primary positioning is especially obvious in the case of mediated reference. This is illustrated in 4.3, which schematically depicts Heather's interpretation of Spencer's postcard.

4.3 PRIMARY POSITIONING IN TERMS OF THE STAR-point

Heather's cognitive representation:

4. The importance of the STAR-point is also shown by the question of whether the tablet is real or fake. While the glyphs remain unaffected by this question, the different hypotheses regarding authenticity lead to vastly different interpretations. Another example is an anonymous letter, whose threatening quality derives in large part from the fact that it specifies the recipient $R$ without revealing the author $A$. 

3. The word 'point' in STAR-point may be interpreted rather loosely. Even in spoken language, the temporal origin is strictly speaking an interval rather than a point. In writing, this interval may be considerable length.
Heather’s current situation is stored at the ST-point: sitting on the beach, she is looking at the postcard. The signs of the postcard, however, are not matched onto the subcontext of the ST-point, but rather onto a subcontext determined by the STAR-point.

Accordingly, Heather does not object to the statement the weather is very cold by pointing to the hot New Zealand summer. Based on the STAR-point, she knows that the words of the postcard refer to New York in winter.

Similarly, when the nosy landlady secretly reads Spencer’s postcard, she is not surprised by Your dog is doing fine, even though she has no dog. Based on the STAR-point, she knows full well that the words of the postcard refer to Heather’s dog.

The function of the STAR-point is twofold. On the one hand, it regulates the reference to data structures already present (as in the case of Heather). On the other hand, if is the basis for integrating new information so that it may be retrieved correctly on later occasions (as in the case of the landlady, but also in the case of Heather).

Thus, the landlady may smile knowingly when Heather later announces an impending visit from New York. This knowledge is based not only on the text of the postcard, but also in large part on the explicitly specified STAR-point, which allows the landlady to put the content into a correct general context.

Signs which do not provide their STAR-point explicitly and completely, as in an undated and unsigned letter, require at least a hypothesis of the likely STAR-point for their interpretation. This is necessary, because the STAR-point provides the primary positioning of the sign relative to the subcontext of interpretation.

5 Literal meaning, context, and speaker meaning

The SLIM theory of language distinguishes three mechanisms of reference, namely those of the sign types symbol, index, and name. Symbolic reference is based on

- minimal meaning\textsubscript{1}, structure of symbols (M-concepts, cf. 2.1) and
- the limited selection of compatible referential objects available in the subcontext provided by the STAR-point.

Consider for example the word table. The multitude of different possible referents, e.g., dining room tables, kitchen tables, garden tables, writing tables, picnic tables, operating tables, drawing tables, etc., of various brands, sizes, colors, locations, etc., is not part of the meaning\textsubscript{1} of this word. The referents arise only at the level of the internal context, whereby, e.g., different kinds of tables are distributed over the subcontexts of the cognitive agent in accordance with previous and current experience as well as language-based information.

Yet a minimal meaning structure of the word table is sufficient to refer properly to any of these different kinds of referents, provided that the subcontext is sufficiently limited. Furthermore, the speaker may differentiate the meaning structure of the referring expression to any degree deemed necessary by syntactico-semantically integrating more symbolic content into the sign, e.g. the table, the garden table, the green garden table, the small green garden table, the round small green garden table, the round small green garden table near the pool, etc.

Accordingly, reference with a symbol will not fully succeed, if the activated subcontext contains several similar candidates, e.g., several prototypical tables, and the speaker fails to provide additional symbolic characterization or a pointing gesture to single out the one intended. Conversely, if the activated subcontext is sufficiently delimited, a symbol may refer successfully even to a nonstandard referent, as in the metaphoric reference of the word table to an orange crate.

6 Non-literal uses

In the speakers’ cognition, a subset of the M-concepts is attached to a finite number of words (symbols). Thus, some of the M-concepts serve two functions: (i) They serve in the construction of the internal context by deriving I-concepts from perception parameters, and (ii) they serve as the meaning\textsubscript{1} of a certain sign type. The speaker’s problem of expressing her or his feelings, of describing observations, etc., consists in finding the right meanings\textsubscript{1} to accurately depict the subcontext to be described.

The speaker is like a craftsman with the task of depicting a subtle landscape in a mosaic consisting of equal-sized tiles with only five colors. While the colors on the tiles are a subset of the colors of the landscape, the M-concepts of the language symbols are abstract types for the concept-tokens of the context (cf. 2.1). The important property common to the tile colors and the meaning\textsubscript{1} of symbols is that

1. they are attached to small external objects (tiles, words) which can be easily manipulated and combined into complex structures, while the landscape and the subcontext are an immovable given, and
2. they impose a simplification on the most elementary level of representation by making available only a comparatively limited set of color or concept values.

The craftsman and the speaker are alike in that they use objects given in advance and in a limited variety to encode highly differentiated internal structures (perception, subcontext) as best they can.

After laying out the general structure of the landscape, the craftsman can use his limited range of tiles in several basic ways. Given a particular spot in the mosaic, he can pick a tile with a color closest to the corresponding spot in the landscape. If the color of this tile and the spot in
the landscape are the same for all practical purposes, he uses the tile in a precise literal manner. If they correspond only roughly, he uses the tile in a vague literal manner.

Given the inherent limitations in his set of tiles, the craftsman will not get far in the attempt to depict the whole landscape literally in his mosaic. There are just too many colors in the landscape for which there are no corresponding tiles. Thus, the craftsman has to use his tiles creatively. Given the dark green of the fir trees, for example, he might prefer to represent them with the blue tiles rather than the green ones. The reason is that the blue tiles have a particular hue (second-order property) present also in the color of the fir trees, but lacking in the green tiles. The choice of the blue tiles to represent the color of the fir trees would be an instance of metaphorical use. According to hierarchy of language uses 6.1 this would be a non-literal, but sincere use.

After a while, the craftsman may not find any of the tiles suitable for a spot in his mosaic, or he might be fed up with trying to find something fitting, or he might just think that the mosaic needs a bit of livening up. Being a good craftsman, he will not pick just a random tile, but choose one that establishes an obvious contrast to what one would expect at this particular point in the mosaic. This may be classified as an instance of ironic use.

In linguistic pragmatics there is an additional type of use, called "mentioning," i.e., the use of the surface of a symbol rather than its meaning, as in 'table' has five letters. The different types of use in the pragmatics of language may be represented in the following hierarchy of uses.5

6.1 THE HIERARCHY OF LANGUAGE USES

- Surface expression with meaning
  - Use of surface
    - Sincere use of meaning
    - Metaphoric use of meaning
  - Precise use of meaning
  - Vague use of meaning

The speaker's non-literal use of symbols, including metaphorical use, fills a genuine need to overcome the inherent limitations of a finite set of word meanings for representing an unlimited variety of different referents.

The hearer's interpretation of theses different types of use is based on the sign's being anchored in a restricted subcontext via its STAR-point, which limits the number of potential referents.

Thus, metaphor is not only a rhetorical device---used as an ornament that could be replaced by equivalent literal terms if the speaker chose to do so (Aristotle's substitution theory). Given that non-literal uses are a normal aspect of internal matching pragmatics based on the principle of best match, metaphoric uses serve both, rhetorical purposes, such as style, brevity, etc., and a profound need to expand the expressive power of the language. This position on metaphor is perhaps closest to Black's (1979) "interaction theory."6

References


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6. Lakoff and Johnson (1980) adopt a Grecoan approach and fail to recognize the crucial role of literal meaning in the interpretation of metaphorical uses. On page 12, they present the example Please sit in the apple juice seat and continue: "In isolation this sentence has no meaning at all, since the expression 'apple juice seat' is not a conventional way of referring to any kind of object." Yet without a meaning there is no way to explain why the seat referred to happens to be the one with the apple juice setting.

The Costs and Potential Benefits of Novel Metaphoric References

Ira A. Noveck  
Université de Grenoble  
CREA-Ecole Polytechnique  
noveck@poly.polytechnique.fr

Maryse Bianco  
Université de Grenoble  
Maryse.Bianco@upmf-grenoble.fr

Abstract

In an effort to point out that metaphor is not an exceptional psychological activity but fundamental to human cognition, many researchers (e.g., Gibbs, 1994) have sought evidence indicating that metaphors do not require extra effort to process. We agree with the assessment that metaphors are not exceptional, but we take issue with the notion that the novel metaphoric references, which Gibbs (1994) studied, are cost-free. We present one developmental study here and refer to another (Noveck, Bianco and Castry, in preparation) that demonstrate that novel metaphors take some cognitive effort to process. Our results also indicate that extra effort does not necessarily mean weaker comprehension. Findings actually suggest that metaphors might provide some benefits for comprehension.

1. Introduction

Although metaphor is ubiquitous in everyday speech as well as the source of much discussion among linguists and literary theorists, it has until recently been only at the margins of psychological research on comprehension. Gibbs (1994) has been one of the exceptional innovators in psychology by bringing figurative language, including metaphor, closer to center-stage. His view is that metaphor is not a special rhetorical device, but fundamental to human cognition. He theorizes that metaphors serve to map one conceptual domain to another in a reflex-like manner.

Work following from the Relevance theoretic approach (Sperber and Wilson, 1985/1996) actually shares much with Gibbs's account. To describe it briefly, Relevance Theory views inference-making as a constant activity in communication geared towards gathering in a speaker's intention. Essential to Relevance Theory is the claim that people draw out as many cognitive effects as possible for the least effort. All the while, people try to reach optimal relevance. Optimal relevance is defined as confirming a previous assumption, contradicting a previous assumption or, by combination, drawing new assumptions. For example, consider the utterance (1) as a metaphorical reply to the question Is John trustworthy?:

(1) John is a soldier.

Such a reply leads to implicatures like John is loyal and John follows orders. Both of these implicatures, through the indirect metaphorical reply, point to yes as an answer to the question.

Should one assume that metaphors come cheaply? Relevance Theory -- like Gibbs's -- assumes that much of figurative language is natural and not special. Unlike Gibbs's theory, however, Relevance Theory considers the costs of utterance-interpretation and thus leaves open the possibility that metaphor processing would require some effort. In this vein, we argue that metaphors -- especially non-conventional ones -- have the potential to consume energy because the propositions they prompt are likely to arrive in a circuitous manner.

Gibbs is skeptical about the Relevance account of metaphor. He writes:

[The] psychological research ... clearly shows that listeners do not ordinarily devote extra processing resources to understanding metaphors compared with more literal utterances. The metaphor-as-loose-talk view [Relevance]... incorrrectly assumes that metaphors, and other tropes such as irony, obligatorily demand additional cognitive effort to be understood (Gibbs, 1994, p. 232).

Part of the support for Gibbs's claims comes from a paradigm (Gibbs, 1990) in which metaphors are shown to be rather efficient in making reference to a previously-stated mention in a text. This could be seen in the following example (2-5), where he presents eight lines of a story concerning a weak boxer and a boxing match (2) before presenting one of three concluding sentences (3-5):

(2) (a) Stu went to see the Saturday night fights.  
(b) There was one boxer that Stu hated.  
(c) This guy always lost.  
(d) Just as the match was supposed to start, Stu went to get some snacks.  
(e) He stood in line ten minutes.

73
(f) When he returned, the bout had been canceled.

(g) "What happened?" Stu asked a friend.

(h) The friend replied,

3. (i) The cream puff didn't even show up.
4. (i) The fighter didn't even show up.
5. (i) The referee didn't even show up.

Gibbs found that the average reading time for control sentences like (5) was not significantly different from (3) or from (4). Thus, Gibbs was not convinced that metaphors require relatively more effort to process. He also gave prominence to a probe task, in which the participant has to determine quickly whether a particular word appeared in the story. A relatively quick "yes" response to the earlier-instantiated referent of the metaphor (or synonymous) term could be a measure of processing effects. For example, a "yes" response to the word "boxer" after reading (5) above would signal that the metaphor served to prime the referent. Although Gibbs found some facilitation for probes following metaphoric conclusions (1118 msec) when compared to the control (1331 msec) condition's conclusions, he also found that the synonymous condition's probes led to latencies (1229 msec) that were statistically comparable to the metaphoric condition's probes. Thus, he took the metaphoric conclusions to be as efficient as the synonymous conclusions.

Noveck, Castry, & Bianco (1999) point out two reasons why Gibbs's findings are not sufficient for arguing that processing a novel metaphor is relatively cost-free. First, the mean reading time of Gibbs’s control sentences is actually intermediate (1867 msec) between metaphoric (2117 msec) and synonymous (1735 msec) sentences; this trend does not capture the distinction of interest. What is noteworthy is that metaphoric conclusions like (3) above took significantly longer to read than synonymous formulations like (4). In fact, the control condition, which is (5) above, leads to rather different implications than either of the two experimental conditions. Second, the mean probe times in the metaphor condition tend to be faster and less error-prone than those in the synonym condition. These findings suggest that there are processing costs associated with such novel metaphors, but that they have the potential to provide benefits as well.

In Grenoble, we are investigating metaphorical reference experimentally with Gibbs's paradigm (1990). We began with two goals. One was to verify that novel metaphorical formulations do indeed require extra effort (as measured through reading times) when compared to synonymous ones (a finding that Gibbs tended to disregard). The other, based on the assumption that metaphorical references do require extra effort, was to determine how such reformulations affect comprehension. As Gibbs's probe findings suggested, the extra effort does not necessarily mean weaker comprehension. We began by studying the development of metaphor comprehension because evidence of effort would be clear in children, who arguably become more proficient readers with age. This work also investigates adult performance.

1.1 Children's comprehension of metaphor

The developmental literature reveals that metaphors develop early and that they are often readily understood (Gibbs 1994, Vosniadou 1987, Winner 1988). For example, Gottfried (1997a, 1997b) showed that 3-year-olds can successfully select metaphorical compound nouns such as "flower candles or stick bug..." as well as produce such metaphorical compounds in a situation where they have to correct a puppet's misproduction. In different tasks, however, Vosniadou & Ortony (1983) found that 3-year-olds did not seem to distinguish between metaphorical and literal meanings while four-year-olds did. These researchers presented children with statements such as "a river is like a..." and were asked to decide which word of the pair (lake/snake) is better in a) a comparison task (river is like a lake/snake) and in b) a categorisation task (river is the same sort of thing as lake/snake). Results showed that 3-year-olds choose the metaphorical and the literal meanings for the 2 tasks equally often whereas 4-year-olds choose significantly more often the literal meaning in the categorization task. This seems to indicate that it is not until the age of 4 that children are aware that the terms involved in a metaphorical comparison do not belong to the same conventional category as the terms involved in literal comparison.

What is the nature of metaphor comprehension and its emergence? While it is beyond the scope of this article to review this question in detail we can draw the following three conclusions from the literature: 1) The ability to comprehend metaphorical uses of language seems to emerge very early, even before 3 years of age (see Vosniadou 1987); 2) This ability develops gradually during childhood and the comprehension of metaphorical assertions depends on the type of metaphor and on task complexity. For example, in a multiple choice task involving subjects aged 6 to 20 years old, Silberstein, Gardner, Phelps & Winner (1982) found that the youngest (6- and 8-year-olds) prefer metaphors based on static properties (shape and colour). The preference moves towards metaphors based on movements and sounds (age 10 to 15 approximately) and the oldest subjects (17- and 20-year-olds) prefer metaphors based on conceptual grounds. 3) In general, it appears from the literature, that 9 to 10 years is an age of transition. From this age, children show an ability to interpret metaphors based on abstract relations and begin to show a capacity to explain metaphorical statements explicitly. Before this age, children's metaphorical ability is limited (Johnson & Pascual-Leone 1989, Silberstein et al. 1982, Vosniadou 1987).

There are two major theoretical explanations of this developmental course. One approach attributes the
development of abstract metaphor to conceptual development (Vosniadou 1987). A second approach proposes that the development of metaphor comprehension is closely linked to growth in mental attentional resources (Johnson and Pascual-Leone, 1989).

The vast majority of research has examined metaphor comprehension with off-line tasks and simple material (words and sentences). One exception is Vosniadou, Ortony, Reynolds & Wilson (1984) who showed that the predictability of a story ending as well as the complexity of the metaphorical sentence influence metaphor comprehension among children aged from 4 to 8 years old. As far as we know, no developmental work has been designed to explore the influence of metaphor through on-line reading tasks.

2. The Experiments

In what follows, we describe work (being carried out in our lab in Grenoble) that is designed to gain greater insight into comprehension of metaphorical reference. We begin by summarizing the first of two studies in Noveck, Bianco and Castry (1999), which serves as the basis of the experimental findings reported below.

All the experiments use stories much like those in Gibbs’s original paradigm. Twenty-four eight-line texts were prepared that could have, as the penultimate line, a sentence containing either a metaphorical or synonymous reference to a previously mentioned item. For example, consider the (translated) story in (6) below and the metaphor in the second to last line (line 6g):

(6)  
(a) Catherine went off to her music lesson.
(b) She was worried because she thought that the lesson would not go well.
(c) During the week, her flute fell and is now a bit cracked.
(d) Yet, the lesson did go well.
(e) At the end, Catherine asked if she played all right.
(f) “You were very good,” replied her professor.
(g) “but your nightingale needs to be repaired.”
(h) She promised to go by the instrument maker.

In the synonymous formulation condition, the second to last line (6g’) read as:

(g’) “but your instrument needs to be repaired.”

Both nightingale (rossignol in French) and instrument (also instrument in French) refer to the flute. In our first study, children aged 4 through 12 were presented 24 such stories (on paper). The versions of the stories were distributed so that a) each child read an equal number of stories having metaphorical and synonymous formulations and that b) sixteen of these stories (half with metaphors and half with synonyms) provided questions that directly ask about the referent. For example, with respect to (6) above the question (presented while the text was available) would be “is it the flute that needs repairing?” Both kinds of formulations ought to prompt a “yes” response.

We found some very telling developmental effects. First, for those in elementary school (in the age bracket 8 through 10), comprehension of synonymous and metaphorical references show minor but consistent differences: Whereas eight-, nine- and ten-year-olds answered correctly after reading the stories containing the synonymous statements at rates of 87%, 91%, and 95% respectively, stories having metaphorical references prompted correct evaluations at rates of 79%, 85% and 88%, respectively. Stories with synonymous formulations provide rates of correct responses that are consistently about 7% higher than those with metaphorical ones. Tests of significance revealed a clear main effect for age and type of referent. In the oldest children studied, one sees the gap between metaphorical and synonymous reference comprehension closing. A visit to a junior high school in the same socio-economic area showed that 11-year-olds yielded the same 7% gap (94% vs. 87%), but that responses from the 12-year-olds showed that synonymous reformulations led to rates of correct performance that were only 2.6% superior to those prompted by stories having metaphorical references (94.9% vs. 92.3%). Analyses by participant are similar. All responses are clearly above chance levels so one can conclude that children are quite competent at detecting and accounting for a metaphorical reference; however, there is a small penalty that becomes less evident with age. These findings are also compatible with prior findings in that the references in the two groups appear to lead to comparable levels of comprehension by 12 years of age.

We suspect that novel metaphors do require extra effort to be understood and that this accounts for the slight, consistent advantage found for their rates of correct responses following stories containing the synonymous formulations. We point out that this effect is evident despite the fact that children have full access to their texts. This effect would also describe why adults take longer to read metaphoric reformulations than their synonymous counterparts even though comprehension would appear equally efficient.

In order to further substantiate our claim that novel metaphorical references indeed take effort to process, we present the results of a series of investigations using on-line reading measures based on twelve of the texts prepared for the study described above. Eight-year-olds, eleven-year-olds, and fourteen-year-olds were presented stories, one line at a time by computer (as in Gibbs’s original paradigm), and their reading times for the metaphorical and synonymous formulations were measured along with their responses to general comprehension questions. Note that this reading task is substantially
become faster readers as they grow older (F(2,144)= 46.27, p<.0001). More interesting is the fact that reading time of penultimate sentences containing the metaphor is significantly longer than those containing a synonym (F(1,144)=53.04, p<.0001). We also find an interaction between age and type of reference (F(1,144)=12.77, p<.0001). As can be seen in Table 2, the difference between the two conditions gets smaller as the subject gets older.

Statistical tests were carried out on the comprehension data. We point out three tendencies while emphasizing effort and effect. One, the developmental trend is pronounced from age 8 to 11. Whereas reading times decline overall and the metaphoric-synonymous gap reduces substantially, significantly higher rates of comprehension begin to emerge among 11-year-olds for the metaphoric condition (p < .01). Two, for the ages 11 and 14, one can see that the on-line processing of the metaphorical reference remains relatively demanding (metaphoric references still require roughly 600 additional msecs to process) but that the extra time is accompanied by deeper comprehension, as indicated by the 14-year-olds rates of correct performance in this condition. Fourteen-year-olds yield rates of correct responses that is significantly higher than the 11-year-olds for this condition (p < .01). Three, the synonymous conditions show no significant gains between the 8-year-olds and the 14-year-olds. In sum, at eight years of age, the metaphor and synonymous references lead to comparable rates comprehension while reading time is much longer for the metaphors. With age, one notes that longer reading times for metaphoric references remain but that it is accompanied by increased rates of comprehension.

Table 2. Mean reading times of metaphorich and synonymous sentences in line 7 of stories (and rates of correct responses to follow-up questions combined, by condition).

<table>
<thead>
<tr>
<th>Reference</th>
<th>Age</th>
<th>Metaphoric</th>
<th>Synonymous</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
<td>8472 msec</td>
<td>6112 msec</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>4745 msec</td>
<td>4138 msec</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>3551 msec</td>
<td>2970 msec</td>
</tr>
<tr>
<td>Adults*</td>
<td>2967 msec</td>
<td>2438 msec</td>
<td></td>
</tr>
</tbody>
</table>

Notes: *Adults also viewed filler stories (see Experiment 1b). N=180.

These findings verify that readers, at all ages, take more time to integrate a novel metaphorical reference than a synonymous one. This developmental finding is indicative of the robustness of the effect. Gibbs’s procedure proves to be valuable for studying children’s reading. This provides evidence that metaphors are not only natural and valuable devices, but that they also render a potentially weak implication more salient. In effect, it is as if they italicize a feature of a story, which has the potential to facilitate comprehension.

2.1b Experiment 1b

The findings of Experiment 1a show that sentences having novel metaphoric references take longer to read than those having synonymous references. In this Experiment, we essentially replicate the finding originally reported by Gibbs with adults.

Method

Subjects. A total of 30 students were recruited from the Université de Grenoble in exchange for course credit. Each student was randomly assigned to one of four material sets and their participation lasted between fifteen about twenty five minutes.

Materials, design, and procedure. The materials and procedure were identical to those in Experiment 1 except that there were 16 stories testing for metaphor comprehension and there were an additional 20 filler stories.

Results and Discussion

We treat mean reading times to the penultimate lines of each story as the dependent variable. As expected, the penultimate lines in the metaphorical versions took significantly longer to read than those in the synonymous conditions (t(15) = 2.48, p < .05). Also, there were slightly higher rates of correct responses to comprehension questions following the metaphoric statements (See Table 2). This finding fits neatly with the developmental pattern described in Experiment 1a.

3. General Discussion

By arguing for the naturalness of figurative language, Gibbs gives the strong impression that metaphors are not costly (“listeners do not ordinarily devote extra processing resources to understanding metaphors”). Based on our reading of his data, however, we were skeptical of this claim. Our initial goal was to determine that the comprehension of novel metaphoric references indeed requires relatively more effort than comparable literal ones. By drawing on Relevance Theory, which highlights costs in utterance interpretation, we argue that it is not surprising to find that novel metaphors require more effort (i.e. longer reading times) than comparable literal anaphors. The Experiments presented here, which included participants of varying ages, show that the metaphor/literal distinction is rather prevalent.

Such findings do not mean that a longer reading time implies weaker comprehension. A more generous reading of Gibbs’s claim is perhaps just that: Metaphors do not encumber readers (despite the evident longer reading times). By focusing on the results of a probe task (which show no significant differences as a function of the metaphor/synonym manipulation), Gibbs (1990)
more difficult (especially for younger readers) in that memory load is more critical here than it is in the study described above. We also tested an adult population that is treated separately (in Experiment 1b) only because their stories were presented along with fillers (which is a common technique in this literature).

2.1a Experiment 1a

In this experiment, we simply chose 12 stories (plus two others for practice problems) from among 24 prepared in Noveck, Blanco, and Castry (1999) and used them for a self-paced reading task with children of three different ages – eight, eleven, and fourteen. This is a novel procedure for children’s reading experiments so we did not know whether reading times would reveal any particular tendencies. In fact, we thought we might find that individual differences in reading ability would be so variable that adult-like findings would be difficult to establish.

Method

Subjects. A total of 149 students -- 50 8-year-olds, 48 11-year-olds, and 51 14-year olds -- were recruited from middle-class schools in the Grenoble area. Each student was randomly assigned to one of two material sets and their participation lasted between ten and twenty five minutes.

Materials and design. Two practice stories and twelve experimental stories were chosen. Each text was seven lines long and each was prepared in two versions. Stories were prepared so that the penultimate line could make reference to an earlier-mentioned item using a metaphor or a synonym. These penultimate sentences were designed to have roughly the same length (with most having 11 syllables). Metaphoric references were designed to be as long (in terms of number of letters and syllables), but not longer than, their synonymous counterparts (in French). The earlier mentioned source word and the two kinds of references are presented on Table 1 below. In constructing the stories, we made sure that the original mention of the to-be-referenced item occurred no later than the third line (but appeared most often in the second).

Participants received all the stories, which were randomly divided into two groups (A and B). Roughly half the participants received the stories with synonymous references in A and metaphoric references in B. The remaining participants received the stories but with synonymous references in B and metaphoric references in A.

One of three types of question followed each text: a) on general comprehension, b) on a detail of the story (this tests for memory), or c) on the reference. For the story in (6) concerning the flute, one can imagine three kinds of questions:

a) Is Catherine angry about her flute being slightly damaged?

b) Is the flute slightly cracked?

c) Is it the flute that needs to be repaired?

In fact, for each story, we originally prepared all three types of questions before distributing types evenly among the experimental stories. Thus, four of the experimental stories were followed by a comprehension question, four by a memory question, and four by a reference question.

Table 1. Antecedent terms and their metaphor and synonymous references from the twelve experimental stories (translated from French).

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Metaphor</th>
<th>Synonym</th>
</tr>
</thead>
<tbody>
<tr>
<td>students</td>
<td>toads</td>
<td>children</td>
</tr>
<tr>
<td>vacuum-cleaner</td>
<td>tank</td>
<td>appliance</td>
</tr>
<tr>
<td>Jean-Pierre</td>
<td>gorilla</td>
<td>lifeguard</td>
</tr>
<tr>
<td>heron</td>
<td>shark</td>
<td>bird</td>
</tr>
<tr>
<td>projector</td>
<td>bécané</td>
<td>machine</td>
</tr>
<tr>
<td>automobile</td>
<td>bathtub</td>
<td>car</td>
</tr>
<tr>
<td>Marie &amp; friends</td>
<td>starlings</td>
<td>children</td>
</tr>
<tr>
<td>ostrich</td>
<td>tornado</td>
<td>bird</td>
</tr>
<tr>
<td>airplane</td>
<td>bird of prey</td>
<td>machine</td>
</tr>
<tr>
<td>elephant</td>
<td>bomb</td>
<td>beast</td>
</tr>
<tr>
<td>pumpkin</td>
<td>monster</td>
<td>citrouille</td>
</tr>
<tr>
<td>flute</td>
<td>nightingale</td>
<td>instrument</td>
</tr>
</tbody>
</table>

Notes. Bécané is an almost-slang term that refers to any mechanical device ranging from bicycles to computers. Citrouille is another way of expressing pumpkin (potiron).

Procedure. Participants were run individually on one of two Macintosh computers having PsyScope software (Cohen, MacWhinney, Flatt, & Provost, 1993). The instructions, which were described on the screen at the outset of the experiment, explained that the computer was going to present a series of stories on diverse topics and that each story will be presented line by line. Participants were asked to read each line naturally, but attentively, and were told that at the end of each story, there will be a question that requires a “yes” or “no” response. To respond “yes”, participants had to press the “O” key on a French keyboard (which is in the upper right hand quadrant) and to respond “no”, the “e” key (which is in the upper left hand quadrant). Appropriate stickers were placed on each of these keys. To bring on the next line in a story, they had to tap the space bar. They were asked to keep their hands positioned over the keyboard -- so that the right index finger hovered over the “yes” key, the left index finger over the “no” key, and the thumbs over the space bar -- for the duration of the task.

Results and Discussion

A 3 (Age) X 2 (Reading time of referent sentence) Analysis of Variance was performed, with age a between-subjects variable and type of reference as a within-subjects variable; it reveals a main effect for each of these factors as well as an interaction. Not surprisingly, subjects
accurately highlights the proficiency of metaphor processing. If this more generous reading is Gibbs’s intended one, then he needs to be clearer about the meanings of the expression processing resources.

We argue that one might well be able to go further: A metaphoric reference’s longer reading time tends to be accompanied by deeper processing. Gibbs’s probe results point to a slight advantage following a relevant novel metaphor as do the rates of correct responses to the follow-up questions in the present Experiments. The presence of the metaphor prompts some effort that is rewarded with a positive effect. Thus, there is an extra cost in processing well-chosen metaphors, but they have the potential to yield some benefits. We are planning further experimentation with adults to better substantiate this claim.

In sum, novel metaphoric references are arguably not extraordinary devices for interpreting utterances or lines of text. From a processing point of view, however, this non-special status is maintained only if one takes into account both costs and benefits. Novel metaphors are surely the source of slow-downs and, presumably, efforts of comprehension. Studies here and elsewhere show that comprehension is not unduly affected by this slowdown. In fact, it appears that the extra processing time associated with novel metaphors allows the reader to more accurately grasp the writer’s intention.

Acknowledgments
The authors wish to thank Alain Castry for his participation in this work.

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GRAMMATICAL IMAGINATIONS.
A HISTORICAL APPROACH TO LINGUISTIC
AND PICTORIAL METAPHOR

Irene Mittelberg
Department of Linguistics
Cornell University, Ithaca, N.Y.
im33@cornell.edu

Abstract

This study represents an interdisciplinary attempt to trace the origins of metaphorical expressions as they can be found in the grammatical terminology. The perspective chosen combines cognitive and historical approaches to the meaning of abstract concepts: cognitive semantics and iconography. It takes into account the historical dimension of the media which have served, for centuries, to represent abstract concepts graspable: figurative language, visual images, and the printed page. Visual metaphors serving as memory aids in Renaissance educational and mnemonic illustrations are related to their linguistic counterparts. The aim is to offer an insight into the conventional repertoire of imaginations of grammar - as discipline and symbolic system. On this basis, the metaphorical concepts recurring in both media are presented.

Grammar is an elaborate symbolic system. It belongs to the group of abstract concepts and imperceptible entities that we treat in our thinking and speech as objects with certain properties, sub-categories, and relations to other concepts. In doing so, we seem to rely on certain mental representations of grammar and a figurative vocabulary to seize its structure and mechanisms. The aim of this study is to make out the metaphorical concepts underlying grammatical terms such as 'construction of a sentence', 'word classes', or 'hierarchical relations' by investigating how the corresponding mental images have been imprinted in the collective memory of speakers. In order to get a grasp on such a process of cultural mediation, I will take into account not only the metaphorical language, but also pictorial representations which have remained prominent throughout the academic history of grammar as one of the seven liberal arts. If we assume that both linguistic expressions and visual images reflect human conceptualization, it seems plausible that they can illuminate as well as complement each other. When you consider, for instance, the fact that metaphors, personifications and allegories can take form by linguistic and pictorial means of expression, it makes it seem worthwhile to explore not only linguistic, but also visual evidence.

1 Approach

To account for the specific properties of both linguistic and visual media, an approach combining linguistic and art-historical perspectives was chosen. Principles of the cognitive metaphor theory developed by Lakoff (1980, 1990, 1987) and Johnson (1980, 1987, 1992) were applied to images of grammar, collected following the iconographic tradition founded by Aby Warburg and Erwin Panofsky (1995, 1979). Lakoff and Johnson (1980) state that "our ordinary conceptual system, in terms we both think and act, is fundamentally metaphorical in nature" (p. 3) and define the essence of metaphor as "understanding and experiencing one kind of thing in terms of another" (p. 5). They further posit that "meaning and value are grounded in the nature of our bodies and brains, and in our physical, social, and cultural environments" (Johnson, 1992, 346). In their search for metaphorical concepts common to all speakers of a speech community or culture, Lakoff and Johnson take
linguistic expressions, i.e. surface realizations of cross-domain mappings, and derive the underlying metaphorical processes. They place the bodily, or sensorial perception in the center of their theory and claim that embodied image-schemas conceptualize our experience at a non-propositional level (Johnson 1992, 349). This study is based on the assumption that these image-schemas anticipate both linguistic and pictorial expressions, and that our perceptual system and image-based reasoning is grounded not only in direct experience, but also conditioned by indirect experience mediated through visual media such as printed words and pictures.¹

As far as the interpretation of visual cultural artifacts is concerned, the school of Iconography and Iconology is particularly suitable, since it does not degrade them as a minor art form, but rather focuses on the meaning expressed by the media. It aims to trace the representational history of motifs and to establish explanatory links between images and their literary sources as well as their socio-historical context. According to Panofsky, the ultimate goal is to make out the mental concepts, mentality, or "Weltanschauungs-Energie" (Panofsky, 1979, 200) of a given period in history, translated by the specific display of the respective motif. Reoccurring patterns in the representation of motifs evidence conventionalized perceptions and finally cultural concepts which are, as it is proposed in this paper, comparable to the metaphorical concepts posited by Lakoff and Johnson. Both approaches investigate the interrelation between meaning, mental modals, and what Gombrich called cultural conventions.

Cultural conventions react back on their users, they are handed down by tradition as the potential instruments of the minds – which sometimes determine not only what can be said but also what can be thought or felt. (Gombrich, 1971, 257)

With this in view, cognitive semantics and iconography can be seen as complementing each other in the sense that the former does not account for the genesis of metaphorical concepts, whereas the latter does so by tracing the cultural origins and developments of concepts. This study wants to provide an insight into the cultural history of metaphorical concepts of grammar under the assumption that the way we conceptualize abstract concepts relies, at least partly, on the interplay of education, representational media, and the conventional mental concepts in a given culture.

2 Images of grammar

In order to sketch the history of the motif grammar, I established an iconography of grammar.² Most of the collected woodcuts and engravings date from the 16th and 17th century and represent creative efforts to visualize abstract concepts in the form of personifications, allegories, and mnemonic illustrations. Among these, the Tower of Grammar (Zurich, 1548) by Heinrich Vogtgherr the Elder (fig.1) was the primary and most fruitful object of my investigation.³ It displays a detailed image of (Latin) grammar as a discipline and as a complex system of categories and mechanism. In the form of a printed flyer, this carefully crafted memory room represented a new vehicle for long existing concepts. In this chapter, I will first briefly discuss its discourse conditions. Then some conventional ways to visualize grammar will be introduced. This will allow us to see reoccurring motifs and embed the tower into its representational tradition. In a next step, the tower will be described and some selected visual metaphors highlighted.

2.1 Printed words and illustrations

As a printed flyer containing pictorial and linguistic elements, the Tower of Grammar reflects the rising tendency among humanist scholars to add illustrations to theoretical, biblical, and all other sorts of texts (Giesecke 1991). As the printing techniques became more sophisticated, visual displays were increasingly used to support comprehension of books written in Latin as well as in the national languages emerging in Europe. The more information was put into print, the higher the need for standardization of orthography and layout (Setтекorn 1988). The fact that vernacular grammars were established and taught in school, and that Latin, the classical language of instruction, was slowly replaced by national languages, can be seen as an act of emancipation from the Latin predominance in education. However, the national languages first had to develop their own grammatical vocabularies as well as adequate structures to be able to compete with Latin. This is also true for rhetoric challenges created by linguistic descriptions of complex images (Warncke 1987). The authors of the Tower of Grammar solve this problem with a compromise: the German text describes only some of the pictorial elements, the grammatical categories are kept in Latin, and hierarchical and functional relations between categories are expressed

¹ The visual images that are the focus of this study are "products of intentional human activity" (Carroll, 1994, 189); they are symbols whose perception is mediated by a certain code comprising a particular domain of knowledge.

² The research center Politische Iconographie at the Warburg-Haus in Hamburg was a valuable source in my search for visual material. Due to the limited space, I can only discuss some selected examples of this collection.

³ Copy: Berlin, National Galleries, Collection of Engravings, 46x24 cm. This art work has two authors, both were well known humanists: Heinrich Vogtgherr the Elder did the artistic work, Valentin Bolts is responsible for the German text which has, according to his origin, a dialectal coloring from the Alsatian region.
Figure 1: The Tower of Grammar, Heinrich Vogtherr the Elder, woodcut, Zurich 1548.
by visual means. At the same time, the bilingual situation at school and in scholarly activity is represented through the combination of Latin Grammar and German commentary. Furthermore, the Tower of Grammar is not a flyer in the classical sense because it does not report on natural catastrophes or other sensational events, but transmits an educated conception of an abstract concept (Harms 1985, XIV). Nevertheless, as a single leaflet it benefited from the flexibility and affordability of this mass medium. We can imagine it as a grammar book supplement or as a poster for classrooms.

2.2 The art of memory

Because of its instructive character, the Tower of Grammar can be related to illustrations from the *ars memorativa* tradition, a discipline which provided, already since ancient times, elaborated techniques to structure and memorize complex speeches, concepts, and theories. After the invention of the printing press, the art of memory (Yates 1966) also faced new discourse conditions, and inner images could more easily become materialized and standardized. With the help of mnemonic devices the artificial memory could be trained to support the natural (*memoria artificialis* and *naturalis*, cf. Ernst, 1993, 75) by imprinting images into someone’s mind. One can further distinguish between a memory for words (*memoria verborum*) and for things (*memoria rerum*). Ernst has pointed out that the two main components of the artificial memory are memory places, *loci*, and memory images, *images agentes*. According to him, it is essential for the art of memory that the human being imagines pictures of *verba* or *res* and assigns those to certain, real or unreal, *loci* in a spatially ordered system, for example a building or some other construction with different levels and rooms. The *Ladder of Ascent and Descent* created by Ramon Lull (Valencia, 1512, fig.2) is only one of numerous examples (Yates, 1966). *Ars memorativa* images thus provide our mind with pre-structured rooms where things and words to be remembered can be placed in a way that they can be easily retrieved and put into relation to one another. Since one has already incorporated the proportions and organization of houses and towers through bodily experience, it is easy to find one’s way through artificially created rooms.

As for the visual memory of grammar, different methods have been used to remember grammatical material. Examples range from playing cards with word classes in the disguise of representatives of social classes (like the *Grammatica figurata*, 1509, fig. 3), figurative alphabets (displaying for each letter an object sharing its form), and human figures with certain inscriptions and attributes depicting grammatical categories (Yates, 1966, 125ff.). As we will see later in this section, the Tower of Grammar fulfills the functions of a memory room in an appealing way.

2.3 Personifications and allegories

Already since antiquity, personifications have been the classical way to visualize abstract concepts in paintings, churches, and public space. *Justice, abundancia, the four seasons, and the seven liberal arts* are popular examples. Human figures were an especially good means for ascribing human qualities to non-human entities, exemplifying a sort of ‘embodiment’ or incorporation of values and wisdom. Grammar was personified by women equipped with different combinations of attributes. Fig. 4 shows grammar captured in the form of a sculpture on the Royal Portal of the Chartreuse Cathedral. The woman is holding fasces exhorting the students to study well. Additional examples would be a hand tablet with the alphabet written on it, or a key signifying grammar’s status as the key science opening the way to the study of other subject matters. Accordingly, grammar is symbolized, in fig. 5, in her frequently cited function as gatekeeper: Nicostrata, the inventor of the alphabet, carries here exactly the above mentioned attributes while guiding a young student into a building, again a tower, where grammar is being taught in the lower levels and all other sciences in the upper levels. This illustration decorates the first page of the grammar chapter of an important 16th century textbook, the *Margarita Philosophica* (by Gregor Reisch, Bale 1517), comprising the canonical wisdom of the seven liberal arts taught at university at the time. Other typical attributes include a file, signifying the intention to sharpen the mind, a vase with medication against errors, or with water pouring from it onto plants indicating that just as water nourishes plants, grammar may be said to prepare and ripen young minds to the attainment of other sciences.

In allegories several personifications appear together; images of the seven liberal arts are classical examples. As a member of this scholarly group, grammar is usually illustrated holding a table or a grammar book.

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5 Please note the similarity to the Tower of Grammar. Volkmann (1929, 144) indicates that each of the eight parts of speech belongs to a series of sub-categories (tempus, genus, etc.).

6 It should be noted that the theme language and the motif tower possess a long common tradition established through numerous images of the Tower of Babel. Most of them visualize the construction process and display similar devices as the Tower of Grammar (ladder, tread wheels, and winches).

7 Already at a first glance, this building reminds of the tower of grammar. As we will see later, the concept of grammar conveyed in the chapter itself also serves as a model.

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4 As Vicari (1993, 162) in her study of Renaissance emblems pointed out, visual data of this sort generally need linguistic support in form of labels and legends to hint at discourse allusions, especially for the uneducated reader who is not familiar with the particular code.
2.4 The Tower of Grammar – a brief sketch

The Tower of Grammar can be described as a memory building with remarkably elaborated features, spaces (loech), and personnel (images agents) distributed onto the different floors. A women personifying grammatica is unlocking the portal for school children who know already their alphabet and conjugations (see the ‘first steps’ leading to the door) and are about to advance in acquisition of grammatical knowledge by walking up through the different levels. Representatives of the eight parts of speech occupy the balcony as well as the window openings of the three upper floors. Each of them is identified by an inscription (verba) referring to the grammatical categories (res) respectively. Also, these personifications are distinguished by different outfits indicating their rank in the feudal hierarchy: on the balcony INTERIECTIO (priest) and PREPOSITIO (scholar), on the second floor PARTICIPIUM (citizen/bourgeois), CONJUNCTIO (merchant), one floor higher ADVERBIUM (knight) and PRONOMEN (count), and at the highest level VERBUM (king) and NOMEN (emperor). The man representing PREPOSITIO is interacting with ACCUSATIVUS and ABLATIVUS. At the outer sides of the lower and upper balcony, four man are involved in various activities: on the left, a guard with a bow, ETIMOLOGIA, is shooting an arch into a target with declension classes; on the right, a writer, ORTHOGRAPHIA, is helping the construction master, SYNTAXIS, lift a building block with a hoist. On the upper left, a trumpeter is taking care of PROSOBIA. Moreover, there are some interesting objects involved in the construction of sentences. On both sides of the tower, we can see two big circles which remind one of clock faces or wheels. The left one contains the properties of verbs (number, person, tense, etc.), the right one those of the noun (case, gender, declension, etc.). In the right upper corner, a ladder with three rungs symbolizes the three degrees of comparison (positive, comparative, and superlative).8

As for the text added to the pictorial elements, it only refers to some of them.9 This might be due to the limited text space, but also to the fact that complex grammatical relations put very high demands on the vernacular languages. Interestingly, visual metaphors compensated the lack of expression, as well as the otherwise common glossaries, by rendering the meaning of terms visible. For instance, the figure representing PARTICIPIUM is holding two parts of two different crowns, signifying that it unifies in itself features of the noun (gender, case) and the verb (tense, meaning). Furthermore, the number of noun and verb properties suggests that it is the above mentioned Margarita Philosophica and not Donati’s traditional Latin grammar ars minor that acts as a textual basis for this illustration. That is, the humanist textbook probably served as theoretical and artistic model alike.

3 Metaphors of grammar

After enumerating some theoretical assumptions, I will illustrate in what way grammatical terminology that we still use today reflects metaphorical processes exhibited by a creatively visualized mental image from the 16th century.

3.1 Abstractness and creativity

Lakoff and Johnson stress the fact that the way we assign meaning to abstract concepts is not only based on bodily experience, but also on mental imagery.10 Moreover, certain source domains are assumed to be particularly apt for structuring abstract notions:

Typically, we understand abstract concepts metaphorically by mappings of structure from source domains that primarily involve bodily interactions such as perception, spatial and temporal orientation, manipulations of objects, and movement through space. (Johnson, 1992, 362)

Personifications represent an additional kind of model. Interestingly, the human being seems to function in different respects as a source for image-schemas -- physically and socially, in manifesting certain characteristics and habits. If we agree with Lakoff (1990, 65) that abstract reasoning is a special case of image-based reasoning, we can say that our imagination of abstract notions is based on and facilitated by internalized images including those mirroring cultural artifacts.

In general, creative works of art can evoke fresh associations in us and allow us to establish connections between things and thoughts not previously ‘figured’ or thought possible (Carroll 1994). Lakoff and Johnson argue, with regard to the notion of aesthetic experience, that, for example, poetic metaphor can create new

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8 Even though there are more things in this illustration that would be worth discussing, I will limit the description to the elements relevant to the next chapter.

9 The title announces instructions as to how to teach the youth the principles of grammar. The text below the woodcut is written in verse form; the four labels set next to the tower describe the duties of the four officers (SYNTAXIS, etc.). It is mentioned in the main text that two kings are in charge of the regiment of the empire and therefore also in the sentence. As a matter of fact, Charles V. and his brother Ferdinand I. shared royal duties at the time when this flyer was created. The political implications makes this work of art even more interesting and culturally valuable. We can assume that it served the intellectual idealization of humanist scholars.

10 Lakoff (1978, XIV): “Thought is imaginative, in that those concepts which are not directly grounded in experience employ metaphor, metonymy, and mental imagery – all of which go beyond the literal mirroring, or representation, of external reality. It is this imaginative capacity that allows for ‘abstract’ thought and takes the mind beyond what we can see and feel.”
understanding and new realities. In this process, sensorial experiences play a key role:

[...] color, shape, texture, sound, etc. These dimensions structure not only mundane experience but aesthetic experience as well. Each art medium picks out certain dimensions of our experience and excludes others. [...] Works of art provide new experiential gestalts and, therefore, new coherences. (Lakoff & Johnson, 1980, 235)

3.2 Spatial concepts

The Tower of Grammar is a metaphor in and of itself: the concept ‘tower’ is mapped onto the concept ‘grammar’ and gives the latter a spatial macro-structure which is filled with additional concepts; thus it has the shape of a CONTAINER with an UP-DOWN ORIENTATION due to its verticality. At the same time, it displays the metaphorical concept THEORIES ARE BUILDINGS just like the memory rooms discussed earlier. All different parts of the building are put to work.11 Even though the tower is completed, the construction tools are still visible. However, it is not shown exactly how the building blocks have to be combined; guidelines on how to apply the framework are thus left out. We can, nevertheless, imagine the scenario with the help of the visual context. Syntax and orthography seem to play important roles in this: they are busy lifting up building materials (words) and might intend to join them to a whole construction (sentence), thereby respecting certain construction rules (syntax, morphology, etc.) as well as demands on the outer form (orthography). The following expressions can be derived from the metaphorical concept GRAMMAR PROVIDES CONSTRUCTION COMPONENTS: ‘the construction of a sentence/clause’, ‘compound sentence’, and ‘building blocks of a sentence’.

As has been pointed out earlier, Grammatica is leading the students into the interior of the tower which is indirectly visible in that the content is practically externalized. However, the students are to go on a tour throughout the building following a prescribed route which can be sketched with the SOURCE-PATH-GOAL schema: the point of departure (SOURCE) is the portal, the destination (GOAL) is stepping out upon the successful acquisition of the subject matter. Along the way (PATH), one is supposed to make certain steps and thereby progress. Consequently, the metaphorical concept LEARNING THE PRINCIPLES OF GRAMMAR IS FOLLOWING A PATH WITH A SOURCE AND A GOAL can be assumed to underlie rather general expressions such as ‘levels of instruction’, ‘progress in learning’, ‘grammar course’, ‘advanced learners’, ‘introduction to grammar’.

Lakoff and Johnson (1980, 126ff.) further underline the fact that linguistic form is understood metaphorically in spatial terms, e.g. in linear order, and that form (CONTAINERS) and content (SUBSTANCE) cannot be separated from each other.12 In this regard, the tower can be perceived as a ‘sentence room’ with different sections: fixed locations within the tower container are filled with (grammatical) categories which are themselves containers being filled with content, e.g. meaning, during the construction process. The conduit metaphor (L.& J. 1980, 127) expresses these dimensions: LINGUISTIC EXPRESSIONS/ GRAMMATICAL CATEGORIES ARE CONTAINERS. Generativist theories in particular make use of spatial metaphors by dealing with constituents moving through space (up and down the tree, from one node to another).

3.3 Personifications and hierarchies

The tower represents a locus for a communicative network consisting of representatives of the feudal class system. Apart from grammatica herself, all personifications are males and are displayed as ‘functional’ members of a social hierarchy. Grammatical categories appear thus in an appealing disguise allowing for new associations, creating a new sense of (metaphorical) coherence. The metaphorical concept GRAMMAR IS A PERSON is not elaborated; solely the introductory function is illustrated. However, the rest of the pictorial elements externalize the inner substance of grammar. The function of each category results from its relation to the other categories and from the hierarchical structures manifested in spatial terms (levels) and social classes (clothes and attributes). Here verb and noun are dominating the structure from the top of the building. All other parts of speech appear subordinated. With respect to Lakoff and Johnson (1980, 15ff.), the following metaphorical concepts seem to hold: HAVING CONTROL or FORCE IS UP, BEING SUBJECT TO CONTROL or FORCE IS DOWN; HIGH STATUS IS UP, LOW STATUS IS DOWN. That is, the conceptualization of abstract concepts relies on experiences with the physical and social environment. According Johnson (1992, 358), experiences with social norms, institutions, and regimes are related to “our social character of imagination” as well as to the way we perceive ourselves as members of society. With this in view, concepts such as A GRAMMATICAL CATEGORY IS A PERSON, GRAMMAR IS A HIERARCHICAL/CLASS SYSTEM, A NOUN IS AN EMPEROR, and A VERB IS A RULING PERSON can be derived. From these spatial and social hierarchies, the following expressions seem to result: ‘word classes’, ‘syntactic relations’, ‘hierarchy of constituents’, ‘government’, ‘command’, ‘control’, and ‘dominance’.

11 Johnson (1987, 106) points out that there are typically ‘used’ and rather ‘unused’ parts of the THEORIES ARE BUILDINGS metaphor. Examples for the former would be ‘foundation’ and ‘construct’, of the latter ‘staircases’ and ‘facades’.

12 Lakoff & Johnson (1980, 126): “Since speaking is correlated with time and time is metaphorically conceptualized in terms of space, it is natural for us to conceptualize language metaphorically in terms of space. Our writing system reinforces this conceptualization.”
4 Conclusion

This study was based on the assumption that metaphors of abstract notions originate linguistically and visually. For the abstract concept grammar, different forms of materialization of mental images were demonstrated, and at the same time, the interplay of the linguistic and the visual was taken into account. It could be shown that there are metaphorical processes underlying expressions in both media. Spatial concepts and hierarchical relations proved to be prominent sources for cross-domain mappings. Having traced the representational history of one particular grammatical imagination, namely the Tower of Grammar, insights into a cultural mediation process was given. It seems that the language we use to talk about functions and categories of grammar reflects cultural conventions that have developed throughout history of this abstract notion. The visual material gathered for the purpose of this study documents examples of the mnemonic tradition as well as various other products of human creativity. Since cross-media correspondences were able to be discerned, it can be suggested that media-historical investigations in the field of metaphor can shed some light on the evolution of mental images.

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References


THE ROLE OF IMAGERY AND NOVELTY IN THE COMPREHENSION OF NOMINAL METAPHORS

NICOLETTA CARAMELLI; GABRIELE VENTURI
Department of Psychology - University of Bologna- Italy
e-mail address: ncaramelli@psibo.unibo.it

Abstract

This research aims to show that the comprehension of nominal metaphors, which are the most simple kind of metaphor, rests not only on propositional content, but also on some underlying dimensions like an imaginality or perceptual component which, at different degrees, affects the way topic and vehicle contribute to the production of their meaning. This same component is also at work when a plausible context for metaphors has to be produced.

1 Introduction

In the last thirty years, a growing number of researchers have been interested in the study of metaphorical sentences. Metaphors may be expressed in a variety of syntactic forms. This study concerns only their simplest form, i.e. nominal metaphors of the form 'The A is a B', in which A is the 'topic' and B the 'vehicle' of the metaphor, as, for example, 'The girl is a rose'.

Being very simple, this form of metaphor is by far the most used in order to highlight the cognitive processes involved in the comprehension of metaphorical meaning. In the current literature, several different theoretical models of comprehension of the meaning of metaphorical sentences have been advanced. According to these models, the comprehension of metaphors can depend on:

- a matching process between the features of the topic and those of the vehicle (Ortony, 1979), or
- a matching process followed by a mapping process of the candidate inferences drawn from the vehicle onto the topic (Gentner, Falkenhainer, & Skorstad, 1988), or
- the formation of a new category defined by the attribution of one or more conceptual components of the vehicle to the topic through a mapping process (Glucksberg & Keysar, 1990), or
- the actual knowledge people acquire in their interactions with the environment through their active role (Dent-Read & Szokolszky, 1993), or
- the existence of metaphorical concepts in long-term memory that are responsible for the ease of their comprehension and the evaluation of their aptness (Gibbs, 1992).

The last two interpretations differ from the first three as they allocate a role to an imagery or perceptual component in the interpretation of metaphorical sentences. In fact, Dent-Read's perspective can be considered as an extension of the ecological theory of direct perception, according to which the same objects afford their meaning to the perceiving organisms. In Gibbs view, inspired by Lakoff and colleagues, all conceptual knowledge is metaphorically organised, i.e. it is the outcome of a culturally determined mapping process that transfers schemata, images and propositional structures from one domain of knowledge to another. Accordingly, there is not a sharp distinction between the literal and the metaphorical use of language.

In a sentence like 'life is a journey', the image schemata of 'journey', called the source, is mapped onto 'life' that is called the 'target'. What we know is experienced, hence perceived, in spatial arrays, so this mapping process is not arbitrary, but it is characterized by the 'Invariance Principle'. This establishes the image-schematic constrains that outline which aspects of the source can be mapped onto the target.

The substantial distinction between the first three interpretations and the last two concerns the way in which metaphors are supposed to be comprehended. While in the perspective argued by Dent Read and Gibbs the new meaning of the metaphor is the outcome of complex processes in which a role is played by perceptual and imagery components, in the other perspectives, these complex processes are a chain of inferences which are supposed to be propositional in nature.

Literature on metaphor and figurative language, however, shows that enduring attention has been paid to highlight the role of imagery in metaphorical meaning understanding from Pollio et al. (1977) and the 'vividness' claim by Ortony (1975), to Verbrugge (1977), Johnson and Malgady (1980), Paivio and Walsh (1993), Lakoff (1987) and many others. They argue that it is not necessary that this imagery or perceptual component gives rise to an explicit image, as it can operate independently from the formation of a definite mental image. The plausibility of this argument rests also on recent research on concept acquisition in children by Mandler (1997)and Smith and Heise (1992) and Barsalou (in press) 'perceptual symbol' theory as well. However, little experimental effort has been made to show precisely whether and, if so, how an imagery component affects the comprehension of metaphors.

In this framework, it is possible to suppose that the meaning of metaphors should be judged easy to be imaged when the image-schemata that have to be constructed to comprehend it resemble those that are
already stored in memory. Whereas, it should be judged difficult to be imaged when the image-schemata necessary to comprehend it differ from the pre-stored ones and has to be constructed anew.

From this assumption as well as from the ‘Invariance Principle’, two hypotheses follow that are to be empirically tested. In particular:

- The meaning of easily imaginable metaphors should rest on the conceptual domain of the vehicle more than that of not easily imaginable metaphors, as its construction takes advantage of the pre-stored image-schemata.

- In establishing the context that metaphors fit in, the conceptual domain of the topic, enriched by the new mapping, should play a more relevant role in easily imaginable metaphors than in not easily imaginable metaphors. In fact, it can be hypothesized that the meaning of these last undergoes a stronger reorganization than that required by easily imaginable metaphors that can benefit from pre-stored images.

2 Method

In order to verify the above mentioned hypotheses, it is necessary to establish different samples of metaphors which differ from each other for imaginability. Then define the semantic domain of their topics and vehicles in order to match the terms produced to convey the meanings and the contexts produced for the metaphors with the terms of the semantic domains of both their topic and vehicle.

2.1 Materials

Four groups each of 20 participants were asked to rate, on a seven point scale, the aptness (How apt are these metaphors to convey their meaning?), goodness (How effective are these metaphors to convey their meaning?), imaginability (How easily can you form an image of the meaning of the following metaphors?), and novelty (How novel do you judge the link between the two terms of the following metaphors?) of 400 not lexicalized nominal metaphors of the form ‘The A is a B’.

From the analysis of these ratings, three groups of metaphors were obtained which were characterized by a high aptness and goodness rate (mean rate 4.5 or more). Metaphors in the first group had a high rate for imaginability (mean rate 5 or more) and a low rate for novelty (mean rate 3 or less). These are called high imagery metaphors (IM) and their comprehension is assumed to be grounded on a mapping that can benefit from the pre-existence of image-schemata. According to the hypotheses, their meaning will be derived from the semantic domain of the vehicle more often than the meaning produced for the other kinds of metaphors. Their context will be derived from the semantic domain of the topic more often than the context produced for the other kinds of metaphors as the pre-existing schemata that provide for their new meaning will help also in establishing a plausible condition for their production.

Metaphors in the second group had a high rate for novelty of the relation between the topic and the vehicle (mean rate 4.5 or more) and a low rate for imaginability (mean rate 3 or less). These are called high novelty metaphors (NM) and their comprehension is assumed to require a mapping based on new image-schemata that have to be created on the spot. Their meaning will be derived from the semantic domain of the vehicle less often than the meaning produced for the other kinds of metaphor. Also their contexts will be derived from the domain of the topic less often than the context produced for I as their meanings are radically new so that also the conditions for their plausible production have to be constructed anew.

Metaphors in the third group were characterized by both a high rate for imaginability (mean rate 4.5 or more) and a high rate for novelty of the relation between topic and vehicle (mean rate 4 or more). These are called high novelty and imagery metaphors (INM). Their comprehension is assumed to require a radically new mapping which is based on pre-existing image-schemata, so that it is possible to suppose that their meaning will derive from the semantic domain of the vehicle more often than the meaning produced for INM. Their context will derive from the semantic domain of the topic less often than the contexts produced for I as the new mapping gives rise to a completely new meaning so that the conditions for a plausible production of the metaphor also have to be constructed anew.

From each of these groups 3 metaphors were selected for the experiment. (see Table 1). It is interesting to note that the topic in NM is an abstract noun, while in both IM and INM it is a concrete noun. Surely, this difference can be responsible for the different imaginability value of metaphors, however this fact does not interfere with the hypotheses of the research.

<table>
<thead>
<tr>
<th>Table 1: Experimental metaphors</th>
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<tbody>
<tr>
<td>NM: 1 The much supported idea was an umbrella</td>
</tr>
<tr>
<td>2 The dissertation of the young student is a glue</td>
</tr>
<tr>
<td>3 The most appreciated concert was a table</td>
</tr>
<tr>
<td>IM: 4 The nose of the grandmother’s friend is one pepperoni</td>
</tr>
<tr>
<td>5 The boat that you can see is a sieve</td>
</tr>
<tr>
<td>6 The dancer on the theater stage is a feather</td>
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<tr>
<td>INM: 7 The father’s hat is a bucket</td>
</tr>
<tr>
<td>8 The pan on the stove is a locomotive</td>
</tr>
<tr>
<td>9 The skyscraper at the end of the road is a giraffe</td>
</tr>
</tbody>
</table>

2.2 Subjects

Thirty students of the University of Bologna volunteered their participation.

2.3 Procedure

Participants were presented with a booklet each page of
which required a different task. On the first page of the booklet there were the 18 nouns forming the selected metaphors (the topic and the vehicle, i.e. 2X3X3) one each line. Participants had to write the first three words that the given words made them think of. The aim of his task was to establish the semantic domain of the topic and the vehicle of the 9 experimental metaphors.

On the second and third pages were the 9 experimental metaphors one each line. On the second page participants were asked to paraphrase the metaphors, i.e. they had to write their meaning. On the third page they were asked to provide an apt context for the metaphors and to mark the ‘yes’ or ‘no’ besides the metaphors whether they did or did not use a mental image while finding out the contexts. So, the same participant defined the semantic domain of the literal meanings of the terms of the metaphors, the meaning of the metaphors, their plausible contexts and whether they used or not a mental image while finding out the context.

Materials were arranged in three different random orders of presentation. The three tasks, presented in a fixed order, required about 20 minutes to be performed.

2.4 Data analysis and results

An overall raw description of the data obtained (see Table 2) shows that with NM participants produce far less paraphrases and contexts than with both IM and INM that do not differ from each other. Moreover, while producing an apt context for the metaphor, they acknowledge forming mental images 50% less times with N than with both the other kinds of metaphor.

Table 2: Raw data for both paraphrases and contexts

<table>
<thead>
<tr>
<th>Group</th>
<th>P</th>
<th>C</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>58</td>
<td>65</td>
<td>36</td>
</tr>
<tr>
<td>IM</td>
<td>88</td>
<td>86</td>
<td>71</td>
</tr>
<tr>
<td>INM</td>
<td>85</td>
<td>84</td>
<td>71</td>
</tr>
</tbody>
</table>

These findings are not surprising: the second is a consequence of the choice of the materials, while the first confirms the greater cognitive effort required to find out the new meaning of the metaphor without any help from the imaginability component.

2.4.1 Association task

Participants produced 1584 associations out of the 1620 expected (18X3X30). Omissions (2.2%) were uniformly distributed among the words. 904 different words were produced. In order to establish the semantic domains of the literal meaning of the terms of the metaphors, two measures were obtained: the frequency of the associations and the strength of the associations, i.e. the ‘centrality’ of the terms within each semantic domain. This last measure was obtained giving a different weight to the associations produced according to the order of their production. Weight 3 was given to the first association, weight 2 to the second, and weight 1 to the third. In this way it was possible to establish which terms belonged to the semantic domain of the terms of the metaphors, how many there were and the strength of their associations.

The aim of this research is not to highlight the enormous complexity of the cognitive processes involved in metaphoric meaning understanding, as it results from the great inter-subjective and intra-subjective variability found in experiments with rating tasks, but only to check whether an imagery component can play a part in it.

2.4.2 Meaning production task

In order to verify whether the meaning of I rests more on the semantic domain of the vehicle than that of both N and IN, the mean number of the terms that were used in paraphrasing the metaphors belonging to the semantic domains of the topic and the vehicle was calculated. Even if the terms of the topic and the vehicle equally contribute to the production of the paraphrases (see Table 3), the graph (see Figure 1) shows that the number of the terms of both the topic and the vehicle used to paraphrase N is much lower than that used to paraphrase both IM and INM.

Table 3: Mean frequency of the terms used in paraphrasing the metaphor’s meaning belonging to the semantic domain of topic or vehicle

<table>
<thead>
<tr>
<th>Group</th>
<th>PT</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>0.138</td>
<td>0.259</td>
</tr>
<tr>
<td>IM</td>
<td>0.875</td>
<td>0.739</td>
</tr>
<tr>
<td>INM</td>
<td>0.659</td>
<td>0.506</td>
</tr>
<tr>
<td>Mean</td>
<td>0.557</td>
<td>0.501</td>
</tr>
</tbody>
</table>

Figure 1: Mean frequency of the terms used in paraphrasing the metaphor’s meaning belonging to the semantic domain of topic or vehicle

The difference between the number of the terms of the topic used to paraphrase NM and that used to paraphrase both IM and INM is statistically reliable (respectively z=-6.5312 p=0.001; z=-5.0052 p=0.001). As to the mean number of the terms of the vehicle used
to paraphrase the metaphors, more terms of the vehicle are used with INM than with NM (z=-3.1097 p=.001) and more terms of the vehicle are used with IM than with INM (z=-2.7937 p=.005). Even if it does not appear in the graph, the number of the terms of the vehicle differ reliably from that of the terms of the topic only in IM (z=-4.5787 p=.0001) as it depends on the different distributions underlying the mean frequencies of the terms of topic and vehicle (see Figure 2).

<table>
<thead>
<tr>
<th>Group</th>
<th>PTW</th>
<th>PVW</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>8.373</td>
<td>15.197</td>
</tr>
<tr>
<td>IM</td>
<td>3.428</td>
<td>25.047</td>
</tr>
<tr>
<td>INM</td>
<td>10.054</td>
<td>12.674</td>
</tr>
<tr>
<td>Mean</td>
<td>7.285</td>
<td>17.639</td>
</tr>
</tbody>
</table>

Figure 3: Mean centrality of the terms of the topic and the vehicle used in paraphrasing metaphors.

Also in this case, the graph conceals the effect of the distribution of the terms that is highlighted in Figure 4.

As to the mean centrality of the terms of the topic and the vehicle used in paraphrasing metaphors (see Table 4 and Figure 3), the centrality of the terms of the vehicle exceeds that of the terms of the topic only in IM (z=-6.2404 p=.0001). In particular, the centrality of the terms of the topic is lower in IM than in NM (z=-6.0254 p=.0001) and in NM it is lower than in INM (z=-5.2273 p=.0001). The centrality of the terms of the vehicle in IM is higher than that in both NM and INM (respectively z=-6.1248 p=.0001; z=-5.0365 p=.0001) and in NM it is higher than in INM (z=-3.5453 p=.0004).

Table 4: Mean weighted frequency of the term used in paraphrasing the metaphor’s meaning belonging to the
Figure 4: Distribution of the weighted mean frequencies of the terms of the topic and vehicle domains occurring in the paraphrases produced for IM, NM, and IMN. The graphs represent in “0” the number of paraphrases where there is no term of the topic or vehicle domain; in “0=>5” the number of paraphrases the weight of which is between 1 and 5; and in “=>5” the number of paraphrases the weight of which is more than 5.

These results show that the meaning of IM derives from the semantic domain of the vehicle more often than that of both INM and NM and that the meaning of the INM derives from the semantic domain of the vehicle more often than that of NM as it was hypothesized. The analysis of the ‘centrality’ of the words used for paraphrasing the metaphors shows that there is a difference between the production of meaning in IM and INM. While the meaning of IM derives from the most central terms of the semantic domain of the vehicle, i.e. from very closely associated terms, the meaning of INM derives from the overall semantic domain of the vehicle in a looser way.

2.4.3 Context production task

The same procedure used to analyse the meaning of the metaphors was used to analyse their contexts. The number of the contexts produced equals that of the paraphrases (see Table 1), however participants used 4 times more often words belonging to the semantic domain of the topic than that of the vehicle (see Table 5) in the context for the metaphors they produced. While in NM these two semantic domains contribute equally to the production of the contexts, as their difference is not significant ($z = -1.7524$ p.<.08), the mean frequency of the terms of the semantic domain of the topic by far exceeds those of the domain of the vehicle in eliciting the context in both IM and INM (respectively $z=-4.8974$ p.<.0001; $z=-4.2214$ p.<.0001) The terms of the semantic domain of the topic are used more frequently in the contexts with INM than with NM ($z = -2.4594$ p.<.01) as can be seen in Figure 5.

Table 5: Mean frequency of the terms of the topic or the vehicle used in producing contexts

<table>
<thead>
<tr>
<th>Group</th>
<th>CT</th>
<th>CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>0.400</td>
<td>0.200</td>
</tr>
<tr>
<td>IM</td>
<td>0.465</td>
<td>0.035</td>
</tr>
<tr>
<td>INM</td>
<td>0.560</td>
<td>0.119</td>
</tr>
<tr>
<td>Mean</td>
<td>0.475</td>
<td>0.118</td>
</tr>
</tbody>
</table>

Figure 5: Mean frequency of the terms used in the production of the contexts for the metaphors belonging to the semantic domains of the topic and the vehicle.

As to the centrality of the terms of the topic used in the contexts (see Table 6 and Figure 6), it is higher in IM and in INM than in NM (respectively $z = -2.5966$ p.<.009 and $z=-3.0841$ p.<.002).

Table 6: Mean weighted frequency of the terms used in the production of the contexts for the metaphors belonging to the semantic domains of the topic and the vehicle.

<table>
<thead>
<tr>
<th>Group</th>
<th>CTW</th>
<th>CVW</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>9.730</td>
<td>21.622</td>
</tr>
<tr>
<td>IM</td>
<td>17.577</td>
<td>19.688</td>
</tr>
<tr>
<td>INM</td>
<td>10.958</td>
<td>5.301</td>
</tr>
<tr>
<td>Mean</td>
<td>12.755</td>
<td>15.537</td>
</tr>
</tbody>
</table>

Figure 6: Mean centrality of the terms of the topic and the vehicle used in producing the contexts for the metaphors.

The centrality of the terms of the vehicle is lower in IM than in NM ($z = -2.6126$ p.<.009) and in INM it does not differ from that in both IM and in NM. While there is a difference in the centrality of the terms of the topic and the vehicle in IM ($z=4.5787$ p.<.0001) and INM ($z=-4.9954$ p.<.0001), in NM the centrality of the terms of
the topic and the vehicle is the same. This is so, even if it
does not appear in the graph as it depends on the similar
distribution of the terms of the topic and vehicle in the
different groups of metaphors (see Fig. 7).

Figure 7. Distribution of the weighted means frequencies
of the terms of the topic and the vehicle in the three
groups of metaphors.

From these results it is clear that the semantic domain of
the topic helps more than that of the vehicle in
identifying an apt context for metaphors and its
influence is stronger with IM and INM than with NM. In
these last, the meaning is deeply transformed so that it is
more difficult to discover a pragmatic condition for their
production as it was hypothesised.

3 Conclusions

The hypotheses advanced in the introduction have been
verified. In fact, the meaning of metaphors, as it is
expressed in paraphrases, depends on the semantic
domain of the vehicle especially in metaphors whose
meaning rests on already established image-schemata as
in IM. This dependence is stronger than when a new
mapping is required as in INM. When a new mapping
has to be performed and there are no pre-existing image-
schemata, as in NM, this relation is weaker still. This
result is confirmed by the higher centrality of the terms
of the vehicle domain in IN than in INM whose centrality
is higher than that in NM.

The context of metaphors depends on the semantic
domain of the topic and this dependence is stronger in
both IM and INM than it is in NM. In these last, the
terms of both the topic and the vehicle contribute equally
to the identification of a plausible context. The higher
centrality of the terms of topic in both IM and INM than
in NM in eliciting context confirms that IM and INM
rest on relatively pre-existing schemata. A weaker
transformation of the topic is required by the mapping in
both IM and HNM than in NM so that, in the former, the
production of an apt context is facilitated.

According to the assumptions advanced in the
introduction, it is possible to conclude that an
imaginability or perceptual component underlies and
guides the mapping process. Its effect was highlighted in
strictly constrained conditions, however it is possible to
argue that it is at work, at different degrees, in the
processing of all metaphorical sentences.

The theoretical hints provided by these results can be
summarized as follows.

Behind the same simple formal structure, 'The A is a B',
different kinds of metaphor co-exist. In this research,
two of them were isolated, imaginability and novelty of
the link between topic and vehicle and checked for their
effects on meaning attribution and context production.
Many other dimensions, however, could be isolated and
analysed. One of the main problems for the experimental
study of metaphorical sentences processing is to
constrain the different dimensions that underly, in
different proportion, the apparently uniform structure of
metaphors. Several of the models of the cognitive
processes involved in metaphorical sentences processing
currently available have to make explicit the a-priori
assumptions on which they rest and update the range of
the phenomena they have to explain.

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Novelty in proverbs comprehension in adolescence
Katarzyna Wiejak
Maria Curie - Sklodowska University
Institute of Psychology
20-080 Lublin, Plac Litewski 5
Poland
e-mail kwiejak@sokrates.lublin.pl

Abstract
Proverbs are figurative expressions that capture the shared beliefs, values and wisdom of a society (Mieder, 1993). They are usually treated as a kind of metaphor or figurative language expressions. Little is known about factors that might contribute to the ease or difficulty of proverbs. However, it is reasonable to expect that a variety of factors, including those that fall into syntactic and semantic domains, may be relevant (Nippold, 1988). For example, syntactically, it may be the case that proverbs that are complex sentences are more difficult to comprehend than those that are simple sentences. Semantically, proverbs that express complex concepts may be more difficult than those that express simpler ideas. However, either of those hypotheses hasn’t been formally explored. Other semantic factors to consider include the concreteness/abstractness and the familiarity/novelty of proverbs. The present study was designated to examine the role of novelty in proverbs understandability by adolescents with different intellectual levels. Two theories of proverbs that seem to be important when we consider the role of novelty, eg. cultural (Mieder, 1993; Lakoff, Turner, 1989) and cognitive views (Honeck, 1997) are compared. Result of presented studies shows that although proverbs occur in cultures, people usually are able recognize unknown sentences as proverbs, and recognize theirs metaphoricity. Understanding novel proverbs should require newly created metaphorical cognitive inventions, thereby more directly probing the abstract attitude rather than depending on a learned response.

1. Proverbs understanding
Proverbs are figurative expressions that capture the shared beliefs, values and wisdom of a society (Mieder, 1993). Pragmatically, such expressions may serve a wide variety of communication functions. They may be used to advise, inspire, console, comment of events and interpret behaviour. They may also be used to foster attitudes such as cautiousness, optimism, pessimism and humility (Nippold, Hag, 1996). It is the reason why proverbs occur in formal and informal spoken and written language genres such as lectures, sermons, conversations, debates, poems, plays, fables, and billboards (Mieder, 1993; Nippold, 1988).

Proverbs are usually treated as a kind of metaphor or figurative language expressions. Fundamentally, figurative language is a form of communication in which some topic is indirectly connected to, and commented on by some vehicle. Proverbs are usually seen as more difficult to understand than other kinds of figurative expressions. First of all, they are a topicless metaphor, for example proverb „strike while the iron is hot” has nothing to do with striking or iron. Because proverbs usually refers to moral norms, values, and principles of behaviour their understanding requires also a wide knowledge about surrounding world. Furthermore, proverbs consists of rarely used words, and sometimes have complicated syntactic constructions.

Proverbs have a number of interesting properties (Honeck, Voegtle, Dorfmüller, Hoffman, 1980). The basic property of proverbs is that they can be understood on both a literal and a figurative level. Moreover, there may be more than one figurative interpretation for a proverb and they may not be on the same „level”. What proverbs „say” (as a literal statement) does not match what they are about or refer to. The figurative level contains information not totally specifiable by the literal level. As Honeck at al. (1980) noticed, all other properties depend upon this fact. A second property is that the relationship between the literal and figurative levels is constrained. That means, the figurative level embeds and is directed by information at the literal level. This property forces us to examine both levels more closely, especially the literal level. A third property of proverbs is that the figurative level need not be, although it often is, signalled by the syntax or the semantics of the statement itself.
1.1. The lexico-syntactical and semantical features of proverbs

Most proverbs are metaphorical. According to literature it is possible to identify some syntactic and lexico-semantic issues that enable us to recognize some statement as a proverb. First of all, in all languages proverbs are stated in present simple tense that is temporally neutral. That's why they can be referred to events anywhere on the timeline from past through future. Temporally unrestricted application opens the way to generalization. That is a power of proverbs, that they use familiar concepts to express a more abstract meaning (Honeck, 1997).

In addition, certain fundamental features of proverbs has been recognized (Gibbs, 1995). Some of them are based on personification (e.g., Misery loves company), hyperbole (e.g., It is easier for a camel to go through an needle's eye, than for a rich man to enter the kingdom of God), and paradox (The nearer the church, the farther from God) (Mieder, 1993). Another features that makes some statement proverbial are as follows. Proverbs have relatively fixed form, proverbial statements have meter (e.g., You can lead a horse to water, but you can't make him drink), rhyme (Haste makes waste), slant rhyme (A stitch in time save nine), alliteration (live and let live), assonance (a rolling stone gather no moss), personification (Necessity is the mother of invention), paradox (No news is good news) and parallelism (A penny saved is a penny earned) (Brunvald, 1968; Gibbs, 1995).

Moreover, Gibbs (1995) marks out certain fundamental proverb structures that have been the basis for dozens of proverbs, for instance, where there's X, there's Y (Where there's smoke, there's fire), no X without Y (No gain without pain), like X, like Y (Like father, like son) and one X does not make a Y (One swallow does not make a summer). Such markers clearly facilitate people's recognition of some linguistic forms as proverbs. In general, the more proverbial markers a statement has, the greater chance it has of being judged as proverbial.

1.2. Theories of proverb comprehension

The ability to understand proverbial sayings has been of great interest to researchers in many areas of psychology. Proverbs understanding has long been seen by psychologist as an index of higher intellectual functioning. Among theories of proverbs two appears to be important when we consider the role of novelty in their comprehension, e.g. cultural and cognitive views.

1.2.1. Cultural view

The cultural view (Mieder, 1993; Lakoff, Turner, 1989) emphasizes the use of proverbs in sociocultural context. The basic premise is that proverbs are cultural linguistic products, created and used in social situations for social purposes. The consequence of this view is belief that figurative meaning of proverbs is highly constrained if not determined by this context. It follows that proverbs have little meaning outside some context, and indeed, the abstraction of proverbs from their cultural context of use is typically seen as unnatural, ecologically invalid, and sterile. A second consequence of the cultural view is assumption that all proverbs are familiar to large numbers of people. There can be no unfamiliar proverbs. Research within the cultural view is likely to be carried out by cultural anthropologists, etnographers, folklorists, some linguists, and an occasional psychologist. The cultural view provides valuable information about factors that can facilitate or inhibit proverb understanding in real-life situations, as well as some answers to questions about the social and historical origin along with the circumstance of proverb usage. However, it does not tell us how people can understand and apply proverbs, nor, what makes a proverb a proverb. One theory of proverb comprehension, the great chain metaphor theory (Lakoff & Turner, 1989), is built on the cultural premise.

1.2.2. Cognitive view

In contrast, according to cognitive view (Honeck, 1997), proverbs are not treated as culturally unique linguistic events, but instead are seen as abstract theoretical entities. There is nothing unique about proverbs insofar as their creation, use and comprehension can be explained by general cognitive principles. Contrary to the cultural view proverbs must be abstracted away from their cultural specifics in order to be understood in their various manifestations and roles in different cultures. The main goal of that view is to determine mental processes that are engaged in proverbs understanding and stress the connection between proverbs understanding and cognitive functioning. The cognitive view assumes that the same set of principles apply to all cases of proverb cognition: understanding or using proverbs in different situations.

Proverbs occur in cultures; their literal content may be unique to cultures; there may be different interpretations for the same proverbs in different cultures; and proverbs may play different roles in different cultures. But the cognitive view rejects the idea that these premises are the proper starting point for a complete and theoretically satisfying understanding of the proverb. To the contrary, proverbs must be abstracted away from their various manifestations and roles in different cultures.

Cognitive view is best represented by extended conceptual base hypothesis (ECBT) (Honeck, Temple, 1994; Honeck, 1997). That theory places proverbs understanding squarely within a problem-
solving framework. A problem exists whenever there is a discrepancy between a current state and a goal state. Proverb understanding involves a number of small goals, largely ill-defined, that must be reached for complete understanding to take place. The ECTB holds that someone who receives a proverb may judge, in irrelevant context situations, that the proverb is about itself but at a more general level. The theory has claimed that proverb understanding results in abstract mental representations. Authors postulates four phases in the process of interpreting proverbs. During the first phase, listener develops a literal meaning model. In next, problem recognition phase, the listener recognises the discrepancy between a proverb as a literal statement and its context. During the literal transformation phase, the literal information proverbs contain, is elaborated and reorganised. Those elaborative processes typically result in two contrasting ideas. That contrast is recognised as potentially referring to some contrast in the communicative situation. In the next, figurative phase, the basis for creating an analogical relationship between the contrasting set of ideas is done. This solution usually creates a conceptual base that is abstract, general, nonverbal and nonimagistic and generative. Finally, in the instantiation phase, the conceptual base is extended to new events, especially when people try to paraphrase the figurative meanings of proverbs.

1.2.3. Novelty in proverbs comprehension
Little is known about factors that might contribute to the ease or difficulty of proverbs. However, it is reasonable to expect that a variety of factors, including those that fall into syntactic and semantic domains, may be relevant (Nippold, 1988). For example, syntactically, it may be the case that proverbs that are complex sentences are more difficult to comprehend than those that are simple sentences. Semantically, proverbs that express complex concepts may be more difficult than those that express simpler ideas. However, either of those hypothesis hasn’t been formally explored. Other semantic factors to consider include the concreteness/abstractness and the familiarity/novelty of proverbs.

Little amount of studies have examined the effects of familiarity on proverb comprehension. Results of those studies are not consistent. Two studies examined this phenomenon in adults and found that high-familiarity proverbs were easier to understand than low-familiarity (Cunningham, Ridley, and Campbell, 1987; Penn, Jacob and Brown, 1988). However, in another studies examined novel instances of figurative language and found that people can understand such language quite readily (Gibbs, 1986; Kemper, 1981).

2. Method
The present study was designated to examine the role of novelty in proverbs understanding by adolescents with different intellectual level.

2.1. Procedure
Two methods were used in this study: Kaczmarek’s Proverbs Interpretation Task (TIP) included 10 common Polish proverbs and English proverb Interpretation Task consisting of 10 English proverbs translating into polish. This is a nonstandardised assessment tool. English proverbs were chosen from Oxford Dictionary of Proverbs. Proverbs, that sounds the same in both languages were excluded (e.g. „Big thunder, little rain”), so the meanings of unknown proverbs could not readily be recalled from past experience. Both tasks were administrated to each subject.

English proverbs unknown in Poland and used in experiment are for example: „Make hay while the sun shines”, „You can’t teach an old dog new tricks” or „The grass is always greener on the other side of the fence”. Examples of polish proverbs used in the study are: „All that glitters is not gold”, „Don’t look the gifted horse in the mouth”.

It is worth to stress that the same idea can be expressed in few proverbs. For example proverb „Strike while the iron is hot” means the same as „Make hay while sine shines”. Although the first one is common in polish language, the second one is unknown.

Both tasks consists of two parts:
I. free interpretation of proverbs - the participants are asked to give open - ended interpretations of each proverb
II. matching sentences to proverbs - subjects are asked to choose out of 3 statements (abstract, literal and bizarre) the one that best explains the meaning of each proverb.

For example proverb „All that glitters is not gold” were presented together with following sentences:
1. Not everything what seems to be good is good.
2. Not only golden things can glitter.

In the first task each proverb were presented in isolation, and the participants were asked to give open - ended interpretations of each statement. Subjects task was to orally explain the meaning of the proverbs. All the utterances of a given subject are tape-recorded, and than transcribed verbatim. The test is administered individually at school. For all subjects, the task was always administered during a single session, subjects were allowed as much time as necessary to complete the task. Most were finished in 20-30 min.
2.1.1. Scoring system

The following scoring system for proverb interpretation enabling a specific categorisation of participants' responses was used. All statements were divided into: abstract, concrete, literal, bizarre, and lack of response. To assist in scoring the responses, the investigators generated a set of answers for the proverbs through a series of discussions. According to the theories of proverb comprehension they can have 2 acceptable, correct interpretations:

a/ general interpretation - when an abstract explanation of a proverb is given

b/ concrete interpretation - when rich and detailed examples are offered by the subject in order to illustrate the proverb's figurative meaning.

Each response was assigned 3, 2, 1, or 0 points using the guidelines contained in Table 1. Total score in that task is 30 points.

Table 1. Types of proverb's interpretations

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT: explanation of proverb on general, abstract level</td>
<td>3</td>
</tr>
<tr>
<td>CONCRETE: interpretation that provide other examples or illustrations of the principles underlying the figurative meanings of proverbs, without conceptualising the principles themselves</td>
<td>2</td>
</tr>
<tr>
<td>LITERAL: explanations of real facts or explanations of the logic's behind the real meaning of a given proverb</td>
<td>1</td>
</tr>
<tr>
<td>BIZARRE: lack of the proverb understanding, statements not connected with the meaning of a proverb</td>
<td>0</td>
</tr>
<tr>
<td>LACK OF RESPONSE: inability to create any explanation</td>
<td>0</td>
</tr>
</tbody>
</table>

Here are examples of each type of utterances discussed:

"Not everything what seems to be good is good" (Jakub, 17 years old, vIQ = 120) - abstract interpretation of proverb "All that glitters is not gold".

"If you have a girlfriend, than as long as you have her, you should talk to her, kiss her, till she is young" (Jacek, 17 year old, vIQ = 108) - concrete interpretation of proverb "Strike while the iron is hot".

"You should strike as it's hot, because it's impossible to strike the cold one" (Darek, 18 year old, vIQ = 78) - literal interpretation of proverb "Strike while the iron is hot".

"Well, if you absolve a horse from guilt, then you don't look him. If he does something wrong and you absolve him from guilt, then you don't look him in the mouth" (Kasia, 17,6 year old, vIQ = 81) - bizarre interpretation of proverb "Never look a gift hors in the mouth".

In the second task - matching sentences to proverbs particular kinds of statements were assigned 2 points for abstract interpretation, 1 - for literal, or 0 points for choosing a bizarre response. Total score possible to obtain in that part of task is 20.

2.2. Subjects

The test was administrated to the17-18 year old adolescents with different language abilities (N=60). All students were native Polish speakers who were attending a public high school (30) and szkoła zawodowa. The screening also involved a brief interview with the examiner so that obvious problems in communication or cognition could be detected. If problems were identified, the individual was not included in the experiment.

Language abilities were measured by WAIS-R(PL) verbal scale. Participants were divided into 5 groups:

1. border of retardation - VIQ 70-79 (N=10)
2. below average verbal intelligence - VIQ 80-89 (N=12)
3. average verbal intelligence - VIQ 90-109 (N=14)
4. above average verbal intelligence - VIQ 110-119 (N=12)
5. high verbal intelligence - VIQ 120-146 (N=12)

2.3. Results

2.3.1. Free interpretation of proverbs

The results of presented study shows that the correlation between ability of understanding Polish and English proverbs is high (P<0,01). It can be noted there that the highest correlation between both kinds of proverbs was observed on abstract level of interpretation (0,79, P<0,01). Between the other levels of understanding correlation was moderate (see Fig. 1). The data suggested that in examined group of adolescents, understanding of unknown, novel proverbs is closely connected with ability to understand familiar one.

![Fig. 1. Correlation coefficient between different types of responses in free interpretation of proverbs](image-url)
In further examination of data the relationship between level of understanding both kinds of proverbs and verbal IQ scores were examined. There is a statistically significant high correlation between general score in free interpretation of proverbs and verbal IQ. However, in English proverbs higher correlation was observed. To examine the strength of the relationship between different types of Polish and English proverb explanations and verbal IQ, correlation coefficients were calculated for each level of explanation.

Fig. 2. Correlation coefficient between VIQ and different types of interpretation of Polish and English proverbs

As shown in Fig. 2, statistically significant, positive correlation in the high range is obtained between amount of abstract interpretations and VIQ in both Polish and English proverbs. Besides, moderate negative correlation between VIQ and the amount of literal, bizarre and lack of responses both Polish and English proverbs and in concrete interpretations only in Polish proverbs. Lack of correlation between concrete interpretations and VIQ in English proverbs were observed. These findings indicate that concrete explanations, that provide other examples or illustrations of the principles underlying the figurative meanings of proverbs are effect of learning the expressions through prior exposure in meaningful context. In presented task subjects hadn’t to rely on their accumulated knowledge of given proverb, so they weren’t able to instantiate the proverb.

The purpose of the present study was to examine the role of novelty in proverbs understanding by adolescents with different intellectual level. In further examination of data the relationship between level of understanding both kinds of proverbs in each of 5 groups was examined. No statistically significant differences between group 1 and 2 is observed, so in further analysis those groups are treated as one.

Fig. 3. Correlation coefficient between particular types of responses in Polish and English proverbs in group 1 and 2 (P<0,05)

As shown in Fig. 3 moderate correlation between lack of responses and literal responses in familiar and unfamiliar proverbs is observed in group of participants with below average verbal intelligence and border of retardation. In third group - subjects with average verbal intelligence statistically significant correlation was reported only in one category of proverbs understanding - in literal responses. Results indicates that statistically significant differences between understanding of Polish and English proverbs were observed in subjects with average or below average intelligence. Novelty of English proverbs caused difficulties with their understanding.

Contrary to described groups of participants, in group of adolescents with above average verbal IQ relationship between level of understanding both kinds of proverbs is noticed.

Fig. 4. Correlation coefficient between particular types of responses in Polish and English proverbs in group 4 (P<0,01)
Statistically significant positive correlation in the very high range were obtained between amount of abstract interpretations (Fig.4). High range relationship between concrete explanation and total score in both kind of proverbs were observed, and moderate correlation in bizarre explanations and lack of response. Results of group with high level of IQ shows correlation from high to moderate in each type of responses (Fig.5).

![Graph](image1)

Fig. 5. Correlation coefficient between particular types of responses in Polish and English proverbs in group 4 (P<0,01)

2.3.2. Matching sentences to proverb

In that task no differences in understanding new and familiar proverbs were observed. Correlation coefficient between total scores in English and polish proverbs was very high (0.87; P<0.001). If the task not requires a verbal explanation of a given proverb unfamiliar proverbs are not more difficult to comprehend than familiar one. The results shows that the abstraction of proverbs from their cultural context is possible. Thus, use and comprehension of proverbs can be explained by general cognitive principles.

![Graph](image2)

Fig. 6 Corelation coefficient between VIQ and different types of interpretation of Polish and English proverbs in matching sentences to proverbs

3. Conclusions and discussion

As pointed out earlier the results of presented study shows that in groups with above average and high verbal intelligence familiarity with proverbs doesn’t influence an ability or level of it’s interpretation. It arise from the fact, that adolescents with higher level of verbal intelligence are able to manage with novelty of a task, and use their intellectual skills to resolve new tasks. According to Sternberg’s theory they shows not only intelligence but also creativity in thinking. They are motivated by going through the given information. It was noted that results of groups with below average and average verbal intelligence are consistent with the „language experience” hypothesis of figurative language development, the view that competence in this area comes from having meaningful exposure to figurative expressions (Ortony, Turner, Larson-Shapiro, 1985).

Results shows that abstract interpretations of familiar proverbs can be just learned and automatically recalled. This is why in intellectual testing using proverbs understanding it’s worth to include new instances of utterances. As pointed out earlier understanding of novel proverbs is determined by mental processes that are engaged in proverbs comprehension and general cognitive functioning rather than by level of their familiarity.

Although proverbs occur in cultures, people usually are able recognise unknown sentences as proverbs, and recognise theirs metaphoricity. Consider the following set of Asian proverbs that should be unfamiliar to most English or Polish speakers (Merwin, 1973). „Don’t judge a man till his coffin is closed”, „Even honey tastes like medicine when it’s medicine”. People see these expressions as proverbial precisely because they immediately recognise their metaphorical character despite their unfamiliarity. Understanding novel proverbs should require newly created metaphorical cognitive inventions, thereby more directly probing the abstract attitude rather than depending on a learned response.

Proverbs typical comment on a context in order to make a point of general significance about it. For this reason, they are hardly spontaneous and may rely more than is the case for metaphor upon their user’s conscious intention. Their successful interpretation in a single context in fact signals the creation of a group of instances. Significantly, in the absence of illustrative context, as it was in the case of study presented above, a proverb is more likely to be interpreted in a figurative way. People know that proverbs are statements that say about general ideas in concrete terms. Those observations strongly suggest that proverbs are not nearly so context-driven. How Honeck (1986) says proverbs function „at a distance” from context. Their understanding is in this sense, more depended on ones knowledge, intellectual and thinking abilities.
It is possible that using proverbs from different culture (Non European) can give another results. A lot of proverbs sounds the same in many European languages, or refer to similar ideas. Even somebody don’t know such proverb, still is able to find similar one presented in own language. Although attempts to interpret meanings of unfamiliar proverbs from different culture can result in a wide array of responses that could have little in common with their actual conventional meanings. But if somebody has the intellectual ability to abstraction and generalisation will try to figure out what such symbols can mean. In conclusion we can say that successful proverb understanding can reveal important insight into how people ordinarily conceptualise many ideas and events in metaphorical terms.

Each of presented views of proverbs - cognitive versus cultural explains different aspects of proverb understanding. In author’s opinion the cultural view explains how proverbs are used in ordinary conversations. To the contrary, cognitive view embraces a theoretical model and research strategy that explicitly attempts to uncover intellectual processes underlying proverbs understanding.

References


An Intensional Dynamic Semantics for Polysemy, Sense Extension and Metaphor

Carl Vogel
Trinity College
University of Dublin
Computer Science
Dublin 2, Ireland
vogel@tcd.ie

Abstract
An intensional logic with dynamic interpretation is presented in order to provide a formal semantics for sense extension, polysemy and metaphoricity. Intensionality is required in order to provide the right account of polysemy. The dynamics are required in order to allow the interpretation of a sentence to impact the interpretation of subsequent sentences by adding any extended expressions. Metaphoricity is captured in the classification of indices at which expressions are evaluated. This abstract presents the structure of the system and briefly explains how it works.

1 Introduction
Non-literal language is typically thought to be outside the purview of model theoretic semantics. Perhaps the formal philosophy of language is influenced by opinions that metaphor as a form of nonliteral language is essentially defective or no more than ornamental, even if its use does offer cognitive insights (Percy, 1958; Aristotle, 1971). At the other end of the spectrum are opinions that all language use is preconditioned by metaphor, that metaphor is fundamental to cognition and is therefore part of the backdrop to the meaningfulness of sentences rather than something conveyed by them, a view inspired by Lakoff and Johnson (1980). In between is a substantial body of research in artificial intelligence that analyses metaphoricity through process models (e.g. Fass (1991); Veale and Keane (1992)).

Fundamental to the process models of metaphor interpretation in artificial intelligence research is that the meaning emerges out of comparisons between domains.\(^1\) Domains are typically encoded as concept hierarchies and comparisons measured via structural morphisms. The system of Veale and Keane (1992), for example, identifies substructures that qualify as the reasonable likeness that makes a metaphorical sentence true or false. Similarly, Fass (1991) assumes an overarching taxonomy for all domains and discriminates literal, metaphorical and anomalous meanings effectively in terms of relative distance in the hierarchy.\(^2\) Clearly such models provide an important part of the interpretation of nonliteral senses.

However, models of metaphor understanding devoted to the process of identifying structural preconditions for metaphor do not provide the whole story: such a system conveys a lot about what a metaphorical sentence could mean, but does not offer insight into whether the sentence is true or not. Truth conditions are a small part of meaning, but a profoundly essential part.\(^3\) In overlooking truth conditions, structural theories are unable to characterize certain dynamic properties of metaphoricity, namely that interpreting a metaphor can change the interpreter’s concept of the world. Of course, when an interpreter accepts the veracity of a declarative assertion, a sort of change of world is brought about, but this is orthogonal to the kind of change that happens with metaphor. Metaphor brings about a change of possible concepts. It is at the heart of the ontogenesis of literal language. Finding a structural mapping among domains is an important part of interpreting a metaphorical sentence, but it is also urgent to account for the fact that often something new is left over after interpretation. A full theory of metaphor in semantics requires a theory of the structure mapping process as well as a theory of truth conditions inclusive of a theory of the impact on truth subsequent to interpretation.

It may seem that the truth conditions of metaphor are trivial. Metaphors are simply literally false,\(^4\) while their counterparts expressed as similes cannot be false.

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\(^1\) Fass (1991) provides a four-way classification of approaches to metaphor: comparison, interaction, selection restriction violation, and convention. His own system is constructed using a synthesis of these approaches. However, the comparison approach is present in all of them—even the selection restriction analysis hinges on classes of restrictions appropriate or not to the words at stake.

\(^2\) The actual calculus for computing distance is rather more complex in detail than that, but essentially it boils down to relative distance.

\(^3\) If truth conditions were not part of meaning, lawyers would not make so much money out of arguing about them.

\(^4\) Or they are patently true: No man is an island.
1) Leslie is a library.

2) Leslie is like a library.

This may suggest that a semantics for natural language which places a great deal of stock in the notion of truth will have a hard time articulating a theory of meaning for metaphorical sentences. Davidson (1984), in fact, argues that metaphoricity is indeed a property of language use, and hence not the business of semanticists.

However, Vogel et al. (1997) and Vogel (1998) argued against the pessimistic extreme of this view and demonstrated that certain aspects of the pragmatics can be captured in a straightforward model theoretic account. Additionally, van Genabith (1999) has provided a type theoretic treatment which analyzes metaphors as reduced similes. Vogel and van Genabith (1999) discuss in deeper detail the differences between the analysis given by van Genabith (1999) and the one proposed here. One difference is that I agree with Davidson (1984) that metaphor should not be analyzed via translation to simile. The truth conditions differ, and there is not a guarantee of a unique simile to translate a metaphor into. Van Genabith claims that the truth value complementarity between metaphor and simile is mitigated when "trivial" likeness relations are ignored. This requires, in turn, that the simile (2) be translated into the reduced typicality sentence (3)

3) Leslie has a property that is a typical property of libraries.

The reductionist account by its essential nature loses grip on an important property of metaphor: similes, even restricted to existentially quantifying over interesting properties, do not have the "special" force that metaphors do. Even restricted to existential quantification over interesting properties, similes retain literal truth when appropriate at all. On the other hand, Metaphors involve (and their first uses create) special senses of the expressions at stake. Obtaining metaphorical truth for the sentence in (4) more simply involves identifying a special sense for "simmering" with at least Val in it than verifying whether Val and contentment stand in a relation that is typical of all simmerings.

4) Val was simmering with contentment

Vogel (1998) gave a first order language in which literal and non-literal utterances can be expressed. There are two main ways in which this system diverges from classical uses of first order logic as a language for meaning representation. Firstly, models for the language initialize each predicate in the language with two characteristic sets rather than one as is usually the case. One of the characteristic sets is the set of objects that satisfy the predicate literally, and the other set, initially empty, is the set of objects which satisfy the predicate nonliterally. Secondly, the approach adopts techniques from dynamic semantics (Kamp, 1981; Groenendijk and Stokhof, 1991). The interpretation of sentences has a dynamic impact on the models. Essentially, certain nonliteral expressions have the capacity to add elements to the characteristic sets of predicates appropriate to the metaphorical sentence under interpretation.

This approach correctly discriminates the truth conditions of metaphors and similes, following the arguments of Davidson (1984) that a compositional semantics for metaphor simply cannot handle them as reduced similes. In this framework, the metaphorical expression remains literally false, although it is true with respect to the nonliteral interpretation. Moreover, the approach accommodates the dynamic aspect of meaning in such nonliteral language — interpreting a nonliteral sentence extends the meaning of predicates at issue by adding nonliterally predicated entities to the corresponding characteristic sets. Thus, the framework provides an analysis of sense extension at the same time. Vogel (1998) discusses certain syntactic constraints that seem to be in place to allow or prevent sense extensions from occurring.

However, this model is not rich enough to make all of the required discriminations.

5) Leslie is a fox.

In particular, the approach does not allow for there to be more than one way for a predicate to be used nonliterally: assuming that (5) was intended nonliterally, is Leslie being described as clever or as attractive? This failing follows as a consequence of the framework's inability to deal with polysemy in general, even for literal predicates. That is, unless each literal sense of "bank" is given a unique predicate name in the language, each with its own characteristic set, then all its meanings are represented by one predicate name with a heterogeneous extension. The latter is inadequate in that few useful generalizations are available for polysemous predicates.

6) ¬ (∃x (Bank(x) → HasAFederalLicense(x)))

The former possibility is inadequate in that it loses track of the fact that the multiple meanings all share the same name. This failure further means that the framework cannot discriminate between the creation of a new metaphor and its reapplication to new instances.

This paper addresses these problems. The main dynamic interpretation ideas from Vogel (1998) are adopted, but recast in an intensional setting. Rather than a first order logic, the approach proposed here is a modal predicate logic. For each predicate, a different possible world provides the characteristic set corresponding to the particular sense at stake. Then, the contrast between literal and nonliteral meaning is based upon the classification of the worlds themselves. This offers an elegant way of modeling the meaning shift that occurs when a metaphor dies: the sense doesn't change, but the classification of the sense as literal or nonliteral does.

Additionally, a greater range of potential metaphorical expressions are handled, individual terms (hence, nominals), in addition to predications that take terms as argu-
ments. The system of Vogel (1998) could handle metaphorical uses of (5) and (7).

(7) Dr. Smith hit her patient with bad news.

(8) Einstein here says he knows how to start the grill.

However, this system did not have a convenient way of handling (8), as it did not permit sense extension for constant terms. Like the original formulation, the current approach addresses only half of the problem of metaphor semantics, though. Still absent is an account of the structural conditions that license a metaphor; for this I assume that some approach like that of Veale and Keane (1992) can simply be adapted. A consequence of lacking a specific theory for structural conditions also entails incompleteness in sense extension on the basis of the conditions: clearly, extending the sense of one expression can trigger the extension of a number of other expressions that figure into the implicative complex associated with the original and identified using structure maps among domains. Nonetheless, this work provides an important part of the overall picture.

2 An Intensional Dynamic Semantics for Sense Extension

2.1 Syntax of the Language

Meanings of sentences are represented here by translation into a language that extends first order expressivity in two ways: one way allows a more precise articulation of the sense of a predicate even under its literal sense; the other allows the meaning of a predicate to be extended to include more entities (and instances of relationships) from the domain and models generated by that domain, thus allowing the creation and re-use of nonliteral senses.

However, the syntax is extended to allow the explicit indication of literal or nonliteral meaning; in fact the language is extended to allow explicit indication of the exact sense of a term from the full range of extant senses of polysemous terms, and expressing which of those senses it is includes expressing whether the use is literal. This is a justifiable increase in expressivity. It is argued by some (Burton-Roberts, 1994) that for speakers, language is unambiguous, if this is the case, and if it isn’t rather that for the speaker language is potentially ambiguous but rendered semantically determinate by intended meaning, then there must be aspects of language (including accompanying gesture) that allow determinate interpretation.5 Certainly for the listener language is underdetermined, and particularly for the listener, ‘body-language’ is taken into account during the interpretation of an utterance. The point isn’t that word-sense disambiguators are necessarily there to interpret in a given utterance, but that there is potential for them to be used. Thus, there will be a signal of

the sense that is used, and if it is present it will be accordingly interpreted; if it isn’t present then interpretation will be made relative to a sense determined otherwise.5

Dfn. 1 Syntax

1. Let the language have a set of constants, C, a supply of variables V, predicates R, indications of sense M, and the usual connectives.

2. If c is a constant and m is an indication of sense, then c_m is a constant.

3. If P is an n-ary predicate name, n > 0, and m is an indication of sense then P_m is a predicate name.

4. The usual combination rules with respect to forming predications, complex formulae and sentences apply

Intuitively, the language can be seen as a very basic intensional system that lacks the usual interpretations for modalities. A predicate has an extension at each ‘world’. It is possible for for a sentence to use a predicate in a way that indicates which world determines the extension of the predicate. It is further possible for a complex sentence to select the sense from one world for one predicate and a different world for a different predicate in the compound. If no sense is indicated for a predicate, interpretation is relative to a particular world. The same is true for constants. It’s best at this point to depart from referring to the indices at which a predicate has an extension as ‘worlds’, but the framework is clearly related to an expressive temporal framework in which it is possible to make statements about the state of the world at one specific time depending on the state at a different specific time. Note further that the constants are interpreted as individual concepts. I will assume that the same domains are available at each index, but it is convenient to let the interpretation of constants fluctuate. This will account for the interpretations of sentences like (5) that use the copula as well as more complicated predications like (7) and (8).

2.2 Interpreting the Language

Let D be a nonempty domain, and W be a set of indices. The interpretation function \( I \) for basic expressions in the language is presented in terms of the tuples comprising it. Assignment functions \( g \) map variables to elements of the domain; sense selection functions \( s \) map sense indicators to indices; and deixis functions \( \delta \) map pointing acts to elements of the domain. Let \( \mathcal{L} \) be a subset of \( W \) corresponding to the indices for literal senses, and define \( N \) as \( W - \mathcal{L} \).

5Josef van Genabith points out to me that this syntax admits, for example, \( c_m \) etc. as constants. The potential iteration survives in the semantics, and this is as it should be, although this isn’t a major point here. It is quite well formed for someone to claim, “In Freud’s sense of Marx’s sense of ‘repression’, economic exploitation is the result of ....” The outermost sense designation is the deciding one.

5Speaking deliberate ambiguity is more complicated on this picture.
Dfn. 2 the basic interpretation function, $I$

1. $\forall c \in C, w \in L, \exists d \in D : (c, w, d) \in I.$

2. $\forall P^n \in R, n \geq 0, \forall \tau \in D^n, (P, w) \oplus \tau \in I \iff P$ is true of the tuple $\tau$ at index $w$.

This specifies the initial interpretation function. When the arity of the predicate is 0, $\tau$ is the empty tuple, and $P$ is just a proposition. The initial nonliteral extension of each predicate is empty. The symbol $\oplus$ is used to denote sequence concatenation. At this point is possible to define the meaning function ($\llbracket \rrbracket$) for arbitrary expressions in $L$. This function depends on the interpretation function $I$, variable assignment $g$, sense indication $s$, an index $w$, and deixis $\delta$.

Dfn. 3 the static denotation function

1. $\llbracket c \rrbracket I^L(s, g, \delta, w) = I(c, w)$

2. $\llbracket x \rrbracket I^L(s, g, \delta, w) = g(x)$

3. $\llbracket (t^1, ..., t^n) \rrbracket I^L(s, g, \delta, w) = (\llbracket t^1 \rrbracket I^L(s, g, \delta, w), ..., \llbracket t^n \rrbracket I^L(s, g, \delta, w))$

4. $\llbracket P^n \rrbracket I^L(s, g, \delta, w) = 1 \iff (P, w) \in I$

5. $\llbracket P^n(\sigma) \rrbracket I^L(s, g, \delta, w) = 1 \iff n > 0, | \sigma | = n$ and $(P, w) \oplus \llbracket \sigma \rrbracket I^L(s, g, \delta, w) \in I$

6. $\llbracket \neg P \rrbracket I^L(s, g, \delta, w) = 1 \iff \llbracket P \rrbracket I^L(s, g, \delta, w) = 0$

7. $\llbracket P \land Q \rrbracket I^L(s, g, \delta, w) = D \iff \llbracket P \rrbracket I^L(s, g, \delta, w) = 1$ and $\llbracket Q \rrbracket I^L(s, g, \delta, w) = 1$

8. $\llbracket \forall x \phi \rrbracket I^L(s, g, \delta, w) = 1 \iff \llbracket \phi \rrbracket I^L(s, g[x/d], \delta, w) = 1$ for each element $d$ of $L$, where $g[x/d]$ is an assignment function just like $g$ apart from the assignment to $x$, which is instead $d$.

The interpretive mechanisms that will be used for the expressive additions to the language are in place, but aren’t utilized. The interpretation function is threaded through the interpretation of sentences, but each clause is static—the interpretation of no constituent creates an addition to the function. Only the index and variable assignment function affect the meaning of an expression. The ability to signal the sense at which an expression is interpreted adds additional possibilities, but recall from the syntax of the language that this is available only for constants and predicates (not proposition letters).

Dfn. 4 sense selecting literal expressions

1. $\llbracket \phi \rrbracket I^L(s, g, \delta, w) = I(c, s(m))$, iff $s(m) \in L$

2. $\llbracket P^n(\sigma) \rrbracket I^L(s, g, \delta, w) = 1 \iff n > 0, | \sigma | = n, s(m) \in L, (P, s(m)) \oplus \llbracket \sigma \rrbracket I^L(s, g, \delta, w) \in I$

3. $\llbracket P \land Q \rrbracket I^L(s, g, \delta, w) = 1 \iff \llbracket P \rrbracket I^L(s, g, \delta, s(m)) = 1$ and $\llbracket Q \rrbracket I^L(s, g, \delta, s(n)) = 1$

The preceding definition simply allows the interpretation of a constant to be determined by the signaled sense (index) rather than the index the interpretation is otherwise relativized to, and similarly for predicates. Further, individual constituents in a complex expression can be interpreted relative to individually signaled senses. If no separate sense is indicated, the earlier clause defines the interpretation relative to a given index for that constituent, provided the index is among the literal indices.

Dfn. 5 nonlinear expressions

1. $\llbracket \phi \rrbracket I^L(c, s(m), (\delta(c))) = I(c, s(m), w) = \delta(c)$, iff $w \in N$ and $\delta(c)$ is defined

2. $\llbracket \phi \rrbracket I^L(s, g, \delta, w) = I(c, w)$, iff $w \in N$ and $\delta(c)$ is not defined but $I(c, w)$ is, and is otherwise undefined

3. $\llbracket \phi \rrbracket I^L(c, s(m), (\delta(c))) = \delta(c)$, iff $s(m) \in N$ and $\delta(c)$ is not defined but $I(c, s(m))$ is, and is otherwise undefined

4. $\llbracket \phi \rrbracket I^L(s, g, \delta, w) = I(c, s(m))$, iff $s(m) \in N$ and $\delta(c)$ is not defined but $I(c, s(m))$ is, and is otherwise undefined

5. $\llbracket \phi \rrbracket I^L(s, g, \delta, w) = g(x), \forall x \in L$

6. $\llbracket (t^1, ..., t^n) \rrbracket I^L(s, g, \delta, w) = (\llbracket t^1 \rrbracket I^L(s, g, \delta, w), ..., \llbracket t^n \rrbracket I^L(s, g, \delta, w))$

7. $\llbracket \forall x \phi \rrbracket I^L(s, g, \delta, w) = 1 \iff \llbracket \phi \rrbracket I^L(s, g[x/d], \delta, w) = 1$ for each element $d$ of $L$, where $g[x/d]$ is an assignment function just like $g$ apart from the assignment to $x$, which is instead $d$.

8. $\llbracket P^n(\sigma) \rrbracket I^L(c, s(m), (\delta(c))) = \delta(c)$, iff $n > 0, | \sigma | = n$ and $\delta(c)$ is defined

9. $\llbracket P^n(\sigma) \rrbracket I^L(c, s(m), (\delta(c))) = \delta(c)$, iff $n > 0, | \sigma | = n$ and $s(m) \in N$

10. $\llbracket P \land Q \rrbracket I^L(s, g, \delta, w) = 1 \iff \llbracket P \rrbracket I^L(s, g, \delta, w) = 1$

11. $\llbracket P \land Q \rrbracket I^L(s, g, \delta, w) = 1 \iff \llbracket P \rrbracket I^L(s, g, \delta, w) = 1$ and $\llbracket Q \rrbracket I^L(s, g, \delta, w) = 1$

12. $\llbracket \forall x \phi \rrbracket I^L(s, g, \delta, w) = 1 \iff O^d = \bigcup O^{d}$, where $\llbracket \phi \rrbracket I^L(s, g[x/d], \delta, w) = 1$, $\forall d \in D$. 

Output interpretation functions ($O^{d}$ and $M^{d}$) are the smallest ones satisfying the conditions.
Definition 5.1-4 handle nonliteral constants: either it is a first and deictic use, or it is a reuse of a previously extended sense. The first use is the case of sense extension—the interpretation function that is the output of interpretation has an additional tuple in it whose content depends on deictic reference (5.1 and 5.3). This is at the heart of what was referred to earlier when mentioning that interpreting a new metaphor changes the interpreter's concept of the world—a new sense exists and has elements within its characteristic set of entities correctly classified by the expression. Subsequent use of the same extended sense may apply it to the same individuals (5.1-4) or to additional elements of the domain (5.1 and 5.3). In the case that deixis isn't given, then it can only be a subsequent use of the sense-extended constant, and is thus static with respect to the interpretation function, whether or not the sense is indicated (5.2 vs. 5.4). The interpretation of variables is unaffected by polysemy. The interpretation of a sequence of constants and variables is sequential, and the output of the interpretation of each term in the sequence is the input to the interpretation of the next one (5.6). Senses may be signaled or not for any of the terms as in the absence of a sense indication, interpretation is just relative to the designated index w. Propositions are not given a dynamic interpretation. Definition 5.8 and 5.9 allow the sense of a predicate name to be extended. In 5.8 the sense is extended at a nonliteral index independently specified, and in 5.9 it is relative to an indicated sense. Note that the output interpretation function includes additions made in the interpretation of the predicates argument. Negation (5.10) has a static interpretation, but conjunction is dynamic (5.11) — the second conjunct of an expression can be interpreted relative to the extended interpretation from the first conjunct. This means that the second conjunct can be a literal predication of arguments with a nonliteral meaning created by prior discourse. Finally, universal quantification (5.12) extends meaning by iterating over all elements in the domain in combinations of the preceding possible ways of extending meaning.

A predicate can be literally true (or false) of nonliteral arguments as well as literal ones, as in example (8). The nonliteral possibilities must be created by prior extension of the interpretation function, according to 3.5. An additional provision is necessary to allow evaluation of nonliteral arguments outside the scope of a literal predicate. Even if an argument of one literal predicate is evaluated at a nonliteral index because of localized sense indications, the predicate itself is evaluated at the literal one.

Dfn. 6 the denotation function, for literal predication involving sense extending uses of arguments

1. \(I[P^n(\sigma)]^{I \cup \mathcal{O}}(s, g, \delta, w) = 1 \text{ iff } n > 1, w \in \mathcal{L} \text{ and } \langle P, w, I[\sigma]^{\mathcal{O}}(s, g, \delta, w) \rangle \in I, \text{ and } \emptyset \text{ otherwise} \)

2. \(I[P^n(\sigma)]^{I \cup \mathcal{O}}(s, g, \delta, w) = 1 \text{ iff } n > 1, w \in \mathcal{L} \text{ and } \langle P, s(m), I[\sigma]^{\mathcal{O}}(s, g, \delta, w) \rangle \in I, \text{ and } \emptyset \text{ otherwise} \)

The interpretation function for nonliteral expressions in general creates a situation in which the expression is true. They provide nonliteral senses for which the expressions are in fact true, even if they are literally false. This system releases the requirement of Vogel (1998) that a prerequisite to extension be the literal falsity of the expression. This means that (5) can be simultaneously literally and nonliterally true (provided, for example, that Leslie is literally a fox, and also a fox in the designated special sense). Recall that definition 3 was called the "static interpretation function". It does not restrict its use for cases in which the index at which evaluation occurs is in \(\mathcal{L} \) and therefore is a literal sense. This means that nonliteral expressions can be true or false there, with respect to whichever index happens to be the default or signaled index. Sense extension cannot happen using the static interpretation function, but re-use of an extended sense can. Thus, once created a metaphor can be re-used as if literal. This correctly captures the fact that (5) can be false, even when used metaphorically, if it isn't the case that Leslie is in the characteristic set of the special sense of "fox". The system also correctly analyzes the first use of a metaphor (subject to certain syntactic restrictions) as inescapably (but nonliterally) true, as first uses require interpretation under definition 5. The syntactic restrictions are to extension of only atomic predication (thus, first use of a metaphor cannot be part of verb phrase coordination), and outside negated contexts. First use of a metaphor requires pointing to a sense, and creating a characteristic set for the expression at the appropriate index. This is different still from adding additional elements to the characteristic set, and different again from using a literal predication of nonliteral arguments. The system admits a wide range of ambiguities, not just among choices of literal meaning for a term, but also from among nonliteral meanings. Notions of truth for arbitrary sentences can easily be relativized as appropriate, and as in natural language more than one is necessary (else the concept of being "literally true" would be redundant).

The difference between literal and nonliteral in this system is not equated with interpretation using definition 3 or definition 5. Rather it is in the classification of the index at which (either static or dynamic) interpretation occurs. This classification consists here in grouping the index at which the interpretation for an expression occurs as within \(\mathcal{N} \) or \(\mathcal{L} \). Of course, there might be some partial ordering on indices, but that seems to involve more structure than is readily apparent in the data. Nonetheless, the "death" of metaphor in this system involves nothing else but the reclassification of the index at which the metaphorical expression is interpreted as being no longer within \(\mathcal{N} \) but \(\mathcal{L} \).

Given some expression to interpret at a nonliteral index that extends the characteristic function for the expression at the index, there are likely other expressions that also require extension. These ancillary expressions are related to the first through an initial theory of the world.
(9) Leslie is a fox.

(10) \forall x \text{ Fox}(x) \rightarrow \text{Mammal}(x)

(11) Type\al x \text{ Fox}(x) \rightarrow (\exists y \text{ Hound}(y) \land \text{Chases}(y, x))

(12) Type\al x \text{ Fox}(x) \rightarrow (\exists y \text{ BushyTail}(y) \land \text{Has}(x, y))

Given the constituent expressions of (9), it is reasonable to imagine that they participate in other sentences that constitute an interpreter's theory of the world, as in (10-12). However, imagine the first nonliteral use of (9) in which "fox" designates a sense corresponding to that of "sly". The notation for "fox" at the new sense is structured so that it has Leslie within it. However, it is also reasonable to consider under this same sense whether other predicates connected to "fox" also require extension to cover Leslie in this new sense. Assuming that Leslie is a human being, a plausible system for deciding which other predicates to extend would leave "mammal" untouched (as Leslie is already there literally), but might be inclined to add Leslie to the set of tuples chased, in a nonliteral sense of chasing that corresponds to the nonliteral sense of "fox" under consideration, while also refraining from extending the sense of "bushy tail" to include Leslie. Identifying which implications are appropriate to a metaphor's implicative complex and which are not is exactly the business of structural mapping process models. I simply assume that one or other of them can stipulate which additional predicates need to be extended and which ones to leave alone. The current framework leaves it to the other half of the full semantic theory of metaphor to specify which implications to break apart and extend. The current example would actually have to expect that the other module would deliver in turn each predicate requiring extension, as definition 5 requires in general that each extended expression be atomic. Coordination and universal quantification are exceptions, but those just reduce recursively to atomic extensions.

Also, note that because negation is handled statically and consequently doesn't admit sense extension within its scope, existential quantification defined from the universal is also static. It would be interesting to consider the ramifications of dynamic interpretation in the sense of this paper for existential quantification as well; it seemingly introduces complexity that more than a single interpretation function would need to be threaded through each clause, one for each possible choice of domain element for the existentially quantified variable. On the other hand, it seems natural to exclude genuine existentials (as opposed to wide scope indefinites with specific interpretation or the predicative indefinites like that in (9)) from the sorts of expressions that have potential for sense extension.

(13) Sal chased a fox.

(14) A radiator chased Sal.

(15) Every radiator chased Sal.

(16) Sal was not chased by a radiator.

(17) Sal was not chased by every radiator.

That is, (13) is well formed as a metaphorical sentence involving a nonspecific indefinite, however it involves the reuse of a previously extended sense of "fox". In contrast, (14) does not involve an established metaphor, and it is correspondingly restricted in being able to generate a new one. The theory presented here discriminates the sense extension potential of (14) from that of (15). However, under the current framework universals are fairly trivial in meaning anyway as they automatically end up extending their constituent predicates to all elements of the domain. Neither the existential nor the universal is dynamic under the scope of negation (16 & 17).

It should be considered an advantage of this framework that it makes definite predictions about conditions for generating new metaphors. The class of preconditions is somewhat different from the aptness ratings obtained from structure mapping accounts. The preconditions here focus on prior use and syntactic constraints on novel use. I am currently developing experiments to test some of the hypotheses generated by the system as a way of double-checking introspective intuitions. Intuitions are difficult, particularly in the case of first use of a novel metaphor because of a tendency to backtrack and extend complex and embedded predicates independently, thus enabling a re-use interpretation, when the context is otherwise inhospitable to sense extension.

3 Discussion

Nonliteral expressions can be nonliteral because of the predicate or because of the argument. The proposed semantics allows extension from the meaning of both basic predicates and arguments. Extension of the interpretation of a constant can fail if there isn't an accompanying deictic act to make clear what the constant is to be extended to, but if deixis is present, a constant can have an extended sense whether used in the scope of a literal predicate or a nonliteral predicate. When used in the scope of a literal predicate, the predicative can turn out to be false. However, when used in the scope of a nonliteral predicate, the sentence will evaluate as true, and will extend the appropriate sense accordingly. It remains possible to extend each sense to the point of triviality by applying it to all elements of the domain, but if everything is spoken nonliterally then discriminations of meaning are meaningless. The meaning of the nonliteral metaphorical sentence is not reduced to the meaning of a simile—it creates a reason for a related simile to be true: nonliteral expressions create an intersection of denotations which thereby licenses a nontrivial likeness between predications involved. The approach does not offer a theory of metaphor resolution. It would be desirable at the point of extending a predicate
at an index to analyze what other entailments from literal senses should yield other predicates to extend at the same index, relying on other work that identifies the conceptual complexes that flesh out a metaphor and make it more or less apt (Veale and Keane, 1992). Reclassification of indices as members of \( N \) or \( L \) captures the drift of new metaphorical senses to literalness.

Acknowledgements

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References


Metaphors and Type Theory

Josef van Genabith
Dublin City University
Computer Applications
Dublin 9, Ireland
josef@compapp.dcu.ie

Abstract

Metaphorical use of language is often thought to be at odds with compositional, truth-conditional approaches to semantics: after all metaphors are literally false. In this paper we sketch an approach to simple metaphors based on standard type theory. The approach is classical: we do not invent a new logic. The approach models sense extension in that a supertype extends the predicate given in a particular sentence while avoiding extending the original predicate. Metaphors are interpreted as reduced similes. A compositional syntax / semantics interface is provided. The approach readily translates into a simple Prolog implementation.

1 Introduction

Non-literal use of language such as metaphor is usually thought to sit uneasily with formal truth-conditional semantics in the Montagovian tradition (Montague, 1973). Metaphors are simply literally false. Consider e.g. the following “established” metaphor, its formalization in FOPL and associated truth conditions:

1. John is a fox. $\{\text{fox}(j) \mid [\text{fox}(j)] = 1 \text{ iff } [j] \in [\text{fox}] \}$

On this account (1) can only be true if $\{j\} \cap \{\text{fox}\} \neq \emptyset$. This, however, is not the case that obtains in the literal use of (1) involving, as it does, a predication of a property to an individual not in the extension of the property predicated. Several responses are possible. One is based on the intuition that in a sense the metaphorical use of (1) is really a reduced simile:

2. John is like a fox.

3. John has some of the properties of foxes.

4. John has some of the typical properties of foxes.

Paraphrases (2) – (4) are readily translatable into standard type theory and a compositional syntax-semantics interface can be set up. Below we sketch the type theory – reduced simile approach.

2 Type-Theory TT

The type theory TT we employ is a sugared version of the typed $\lambda$-calculus (see e.g. Gamut (1991)). The set of types $T$ is defined as $e, t \in T$ and if $a, b \in T$ then $(a, b) \in T$. The basic vocabulary of TT has sets of variables $\text{Var}$, and constants $\text{Con}$, for each $\tau \in T$. The syntax closes TT under application, abstraction, the logical connectives and quantification. Interpretation is relative to models $M = (D, \exists)$ where $D$ is a domain of individuals and $\exists$ an interpretation function interpreting constant symbols. Types are interpreted as function spaces (domains). Interpretation domains $D_{\tau}$ for types $\tau$ are defined as $D_{\tau} := D$, $D_{\tau} := \{0, 1\}$ and $D_{(a, b)} := D_{a} \times D_{b}$. Given a model $M = (D, \exists)$ with $\exists : \text{Con} \rightarrow D_{\tau}$ and $g : \text{Var} \rightarrow D_{\tau}$ for each type $\tau$ the interpretation function $[\cdot]$ is defined as follows:²

1. $[c]_{M, \sigma} = \exists(c_{a})$; $[x_{a}]_{M, \sigma} = g(x_{a})$

2. $[\varphi_{(a, b)}(\psi_{a})]_{M, \sigma} = [\varphi_{(a, b)}]_{M, \sigma}([\psi_{a}]_{M, \sigma})$

3. $[\lambda x_{a}\varphi_{b}]_{M, \sigma}$ is that function $h$ such that for all $u \in D_{a}, h(u) = [\varphi_{b}]_{M, \sigma[u/x_{a}]}$

4. $[\neg \varphi_{a}]_{M, \sigma} = 1 \text{ iff } [\varphi_{a}]_{M, \sigma} = 0$

5. $[(\varphi_{a} \land \psi_{b})]_{M, \sigma} = 1 \text{ iff } [\varphi_{a}]_{M, \sigma} = 1 \text{ and } [\psi_{b}]_{M, \sigma} = 1$

6. $[\forall x_{u}\varphi_{a}]_{M, \sigma} = 1 \text{ iff } \forall u \in U_{a} \ [\varphi_{a}]_{M, \sigma[u/x_{a}]} = 1$

For readability, we will suppress type annotations in the formulae below.

3 Similes in TT

On the most natural reading of the simile interpretations (2) – (4) the object NPs are given generic interpretations:

²The remaining connectives and quantifiers are defined from these in the usual fashion.
(5) John has a property which is a property of all / most / typical foxes.

Below we approximate the genericity of the object NP argument by simple universal quantification.3 (5) is then approximated by the following TT expression:

\[ \exists [P j \land \forall x (\text{fox} x \rightarrow P x)] \]

which comes out as true if there exists a property \( P \) denoting a subset of the domain which includes both the extension of \( j \) and the (members of the) extension of the fox predicate:

\[ \{ \text{fox} \} \cup \{ j \} \subseteq [P] \]

This analysis captures sense extension in a simple and elegant way. The fox predicate remains unchanged.

3.1 Trivialization

Note that the domain of interpretation itself is a set which trivially includes the the extension of \( j \) and the extension of the predicate fox (Davidson, 1984). From this it follows that the universal property \( \forall x . x = x \) trivially satisfies (6). It is possible to avoid trivialization by requiring that \( P \) may not be instantiated to a universal property, e.g.:

\[ \exists [P j \land \forall x (\text{fox} x \rightarrow P x) \land \neg \forall x P y] \]

It is arguable that trivialization is the limit case of non-literal use of language. (6) is admittedly a very weak translation of (1). The intended interpretation might be that \( P \) be instantiated to what is perceived as a typical property of foxes, such as for example that of being clever or cunning. In the translation this can be captured with a \( ty \) function of type \( ( \langle e, (e,t) \rangle ) \) relating individuals and typical properties:

\[ \exists [P j \land \forall x (\text{fox} x \rightarrow (P x \land ty x P))] \]

In this case, lexical semantics would provide suitable instances of \( P \). To do this with any degree of confidence requires a psycholinguistic or cognitive theory of metaphor resolution which is beyond the more confined concerns of the present paper. Notice that in the simple sketch given in (9) metaphoricity is relegated to whatever is perceived typical. This analysis does not seem to do gross injustice to the present example which is an instance of an "established" metaphor. However it cannot claim and is not meant to be a general theory of metaphoricity. What is important is that (6), (8) and (9) can be obtained compositionally in terms of a standard syntax/semantics interface (see section 5 below) and that more sophisticated theories of metaphoricity can be integrated into the proposal if such are available.

3 More sophisticated (and appropriate) treatments are possible, see for example Carlson and Pelletier (1995).

3.2 More Complex Predications

The formulae in (6) and (9) encode a simple supertype/sense extension analysis of simple metaphors. As pointed out, any instantiation of the unary predicate \( P \) that makes (6), (8) and (9) true denotes a superset including both the denotation of \( j \) and the elements in the denotation of fox. It is here that a sense extension dimension of metaphor can be located in the type theory approach. The basic idea can easily be generalized to cover more complex predications as exemplified by the well-worn

(10) My car drinks gasoline.

To a first approximation the non-literal use of (10) can be paraphrased as

(11) My car and gasoline stand in a relation which is a property of all drink relations.

The relation in question is probably something like the consume relation. Every drink event is also a consume event (but not the other way round).6 (11) is readily formalizable. Here we translate the definite possessive NP my car as a constant \( c \) and simplify the merotetical NP gasoline as:

\[ \exists P (P c \land \forall y (\text{drink} y x \rightarrow P y x)) \]

\( P \) is of type \( \langle e, (e,t) \rangle \). As was the case with the simple predications in (6) above, (12) is trivialized by the universal relation \( R \) where \( x \) is related to \( y \) if they are in the same set (e.g. the universe of interpretation). Again this may reflect the limit case of non-literal use of language. It can be ruled as follows:

\[ \exists P (P g c \land \forall y (\text{drink} y x \rightarrow P y x) \land \neg \forall x P y) \]

(12) is a weak translation of (10). Of course, it can be strengthened by a typicality requirement along the line of (9).

The consume predicate provides one of the instantiations of \( P_{\langle e, (e, t) \rangle} \) in (12). Our view is that, to begin with, formal semantics provides the machinery for compositionally constructing representations but not unique resolutions of supertype predicate variables in non-literal use of language. An idea for how to integrate a notion of resolution into the present framework is developed in section 4 below. Note that (12) only indirectly captures a potential selection restriction violation between drink and its subject NP (animate). Furthermore, by itself (12) does not support any inference as to excessive amounts of consumption often attributed to (10).

Example (10) is similar to the following:\footnote{Note again that a simple mapping postulate based approach doesn't work since the literal reading is simply false.}

(14) I wrestled with the idea.

\[ \begin{array}{c|c|c}
1 & T & clever j \\
2 & T & \forall x (\text{fox} x \rightarrow \text{clever} x) \\
3 & F & \exists [P j \land \forall x (\text{fox} x \rightarrow P x)] \\
4 & F & \text{clever} j \land \forall x (\text{fox} x \rightarrow \text{clever} x) \\
5 & F & \text{clever} j \land \forall x (\text{fox} x \rightarrow \text{clever} x) \\
6 & F & \forall x (\text{fox} x \rightarrow \text{clever} x) \\
\end{array} \]

5To keep things simple in this section we'll consider the "trivial" version of the simile reading of (1). The proofs shown below can easily be extended to the versions that exclude trivial instantiations of the \( P \)-predicate.

6Readers worried about the higher order reasoning task are referred to standard logic textbooks such as e.g. (Gamut, 1991).

We assume a generalized quantifier type \( \langle e, (e,t), (e,t) \rangle \) analysis of NPs. The type theory translations of the ter-
The minimal symbols of the grammar are:

\[
\begin{align*}
\text{john} & = \lambda P. P \; j \\
\text{gasoline} & = \lambda P. P \; g \\
\text{my car} & = \lambda P. P \; c \\
a fox & = \lambda P. \exists x (\text{fox}(x) \land P \; x) \\
a fox_{gen} & = \lambda P. \forall x (\text{fox}(x) \rightarrow P \; x) \\
is & = \lambda P. \lambda x \lambda P. \lambda y (x = y) \\
is_{ty} & = \lambda P. \lambda x \lambda P. \lambda y (P \; z \land Q \; P) \\
\text{drinks} & = \lambda P. \lambda x \lambda Q. \lambda y (\exists R \; y \; z) \\
\text{drinks}_{\downarrow} & = \lambda P. \lambda x \lambda Q. \lambda y (\exists R \; y \; z) \\
\end{align*}
\]

In this grammar we have glossed over the internal complexity of NPs. We assume that an indefinite NP such as a fox is ambiguous between an existential and a universal (quasi-generic) interpretation. The copula is ambiguous between a literal (+) and a non-literal (-) interpretation, as is the transitive verb drinks. For good measure, we have added the interpretation of the copula which includes the typicancy requirement (a non-triviality constraint as in (8) can be included in just the same fashion). The reader is invited to check that the grammar maps (1) to \(\exists x (\text{fox}(x) \land z = j)\), (6) and (9). It maps (10) to (12). As it stands, the grammar overgenerates: it combines the “generic” reading of the object NP with the literal reading of is etc. Such readings can be excluded by features in a more detailed encoding of the fragment.

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References


Appendix A

It is, of course, straightforward to implement the grammar (that is part of the point of the exercise) as e.g. a toy DCG:

\[
\begin{align*}
\text{app} & \text{ly}(\text{la}(X,Y,X,Y)). \text{app}lication \\
\text{and} & \text{reduction} \text{sim}ulation \\
\text{m} & \rightarrow \text{np}(\text{NP}), \text{vp}(\text{VP}) \\
\text{vp}(\text{VP}) & \rightarrow \text{v}(\text{V}), \text{np}(\text{NP}) \\
\text{np}(\text{la}(P,F)) & \rightarrow \text{[john]}, \text{[apply}(P,\text{john},F)). \\
\text{np}(\text{la}(P,G)) & \rightarrow \text{[gasoline]}, \text{[apply}(P,\text{gasoline},G)). \\
\text{np}(\text{la}(P,F)) & \rightarrow \text{[my car]}, \text{[apply}(P,\text{car},F)). \\
\text{np}(\text{la}(Q,\text{exists}(X, \text{fox}(X) \land Q X))) & \rightarrow [a, \text{fox}], \text{[apply}(Q,\text{X},QX)). \\
\text{np}(\text{la}(Q,\text{forall}(X, \text{fox}(X) \land Q X))) & \rightarrow [a, \text{fox}], \text{[apply}(Q,\text{X},QX)). \\
\text{np}(\text{la}(Q,\text{la}(Y,\text{exists}(P, \text{POT} \land Q P)))) & \rightarrow [\text{is}], \text{[apply}(Q,\text{la}(X,\text{POT})),QP)). \\
\text{np}(\text{la}(Q,\text{la}(Y,\text{exists}(P, \text{POT} \land Q \text{Sem})))) & \rightarrow [\text{is}], \text{[apply}(Q,\text{la}(X,\text{POT})),\text{QSem})). \\
\text{np}(\text{la}(X,\text{Sem})) & \rightarrow [\text{drinks}], \text{[apply}(Q,\text{la}(X,\text{drinks}(X,Y)),\text{Sem})).
\end{align*}
\]
As indicated in the main body of the paper, the grammar overgenerates. This can be ruled out in terms of features in a more realistic implementation:

```
?- test.
1: [john, is, a, fox]
Sem:: exists(252, fox(252)&{john=252})

1: [john, is, a, fox]
Sem:: forall(252, fox(252)>{john=252})

1: [john, is, a, fox]
Sem:: exists(272, 272@john = 252, fox(252)&{john=252})

1: [john, is, a, fox]
Sem:: exists(278, 278@john=exists(258, fox(258)&{2780_258>&{258,278}))

1: [john, is, a, fox]
Sem:: exists(278, 278@john=forall(258, fox(258)>{2780_258>&{258,278}))

2: [my, car, drinks, gasoline]
Sem:: drink(car, gasoline)
```

Appendix B

In this section we extend the Prolog implementation given in appendix A to handle the example (14): I wrestled with the idea. All that is required is the following additional lexical entries:
Comparing Two Views of Metaphor Semantics

Carl Vogel* and Josef van Genabith†
Trinity College*
University of Dublin
Computer Science
Dublin 2, Ireland
vogel@tcd.ie

Dublin City University†
Computer Applications
Dublin 9, Ireland
josef@compapp.dcu.ie

Abstract
Criteria are presented and argued as necessary qualities of any formal semantic account of the meaning of metaphorical sentences in natural language. Two recent frameworks that attempt to provide semantic analyses for metaphor are critiqued relative to these criteria.

1 Introduction
One line of thought about metaphor is that it is a defective form of language use. Certainly, it has been neglected by most researchers in natural language semantics working within a model theoretic tradition. This is in part because by its very nature as nonliteral language, metaphorical sentences are hard to accommodate in any model of sentence meaning that gives prominence to truth conditions. Davidson (1984) has gone so far as to suggest that metaphoricity isn't a property of sentences themselves, but uses of sentences, something that takes them outside the field of study for semanticists. However, there has been a recent approach in semantics that gives equal attention to the change of information state induced by the interpretation of a sentence (hence its impact on the interpretation of subsequent sentences). Such an approach makes it possible to address some aspects of language use in the formal semantic models.

There are two approaches that we know of that attempt to offer a compositional semantics for metaphor. The first (Vogel, 1998, 1999) assumes translation from natural language to a formal logical language. Vogel (1998) uses translation to first order logic and Vogel (1999) uses a more expressive intensional logic. The logical languages are given nonclassical interpretations, however; a dynamic system is used so that a nonliteral expression can have the impact on subsequent discourse that though literally false, it is nonliterally true. The second approach is offered by van Genabith (1999). This system uses a fully classical, but expressive type theoretic framework. In this work, each metaphorical sentence is read as corresponding reduced simile.

A goal of this paper is to critique these two approaches. We outline a number of features that should be present in a good model theoretic semantics for metaphorical sentences. We provide an overview of each of the two main approaches in this area, evaluating them with respect to the desiderata. Finally, we compare the theories directly with each other.

2 Desiderata
2.1 Compositionality
On the one hand, it is often assumed that metaphor presents a prima facie case for semantics to deal with a sentence whose meaning is more than the sum of its parts, on the other hand, it is argued that a metaphor is simply not effectively paraphrased by a related simile. Davidson (1984) makes this point quite clearly.

Both the elliptical simile theory of metaphor and its more sophisticated variant, which equates the figurative meaning of the metaphor with the literal meaning of a simile, share a fatal defect. They make the hidden meaning of the metaphor all too obvious and accessible. In each case the hidden meaning is to be found simply by looking to the literal meaning of what is usually a painfully

\[Pg. 254.\]
trivial simile. This like that—Tolstoy is like an infant, the earth like a floor. It is trivial because everything is like everything, and in endless ways. Metaphors are often very difficult to interpret and, so it is said, impossible to paraphrase.

It is important to realize that Davidson’s criticism only applies if a corresponding simile is allowed to range into the trivial. It is more than doubtful, however, that in most cases of actual use similes are used trivially in communication. In addition, it remains to address the question of what that “hidden” meaning that is more than the sum of the parts could be. A theory of metaphor that provides an answer should at least capture the fact that there is not just any arbitrary likeness between the vehicle and tenor that a simile seems to explicitly existentially quantify away. The metaphorical meaning must be given a clear model just as literal predicates are modeled by their characteristic sets. Moreover, this meaning must emerge from the composition of the parts of a sentence in a context in a way that discriminates between metaphorical and literal readings.

2.2 Truth Conditions

Another way of stating the above constraint on theories of metaphor is that truth conditions remain important to our understanding of language. On the face of it, metaphors and similes have very different truth conditions, and this difference should be localized in any theory of metaphor. Similes cannot be false; they assert the existence of a likeness that does not have to be pinned to any particular property (1).

(1) The nation is like a cheesecake.

It follows that the negation of a simile is false:

(2) The nation is not like a cheesecake.

Notice, however, that this observation only holds if we are prepared to admit trivial likeness as in Davidson’s “...everything is like everything, and in endless ways.” Trivial use of similes of this sort is probably quite rare in actual communicative exchanges (except in puns and jokes). Rather, as is the case with metaphor, the communicative function of a simile is an instruction for the recipient to establish some particular properties instantiating likeness between tenor and vehicle.

By contrast, metaphors seem to be literally false (3), and their negations true (4).

(3) The whale is a blimp.

(4) The whale is not a blimp.

(5) No man is an island

Yet, sentences like (5) demonstrate that metaphoricity transcends falsity. It isn’t the case that every false sentence is metaphorical.

2.3 Aptime

The aptness of a metaphorical sentence is something like a measure of its appropriateness in a given context. However, it has a different nature than choice of speech act or other pragmatic decisions that occur in the formulation of sentences to determine appropriateness.

(6) Could you please pass the salt?

(7) This soup could do with a bit more salt.

(8) This soup was not made with the waters of the Great Salt Lake.

This is partly evident from the fact that speech acts combine with metaphors. The difference to finding the right level of politeness is that aptness is a measure of semantic appropriateness, even though it does draw on world knowledge, and context in addition to the sentence at hand. We use the expression “semantic appropriateness” to address the intuition that while literally the sentence seems false (or true, depending on the negative polarity), relative to the nonliteral senses at stake, the sentence is true. In fact, the primary issue at stake with aptness is that although the grounds need to be relativized to nonliteral senses, truth does seem to be the right way of characterizing the basic level of aptness of a metaphor.

Of course, this is not all there is to aptness. Some are more apt than others. This seems to involve ancillary predications, and the degree to which the metaphor “extends” or falls apart under scrutiny. The contribution of these additional predications is still in terms of their holding or not, but with some further assessment of their number, and as well of their analogical importance to the metaphor at hand, where analogical importance can be determined structurally using mappings between associated implicative complexes (Veale and Keane, 1992).²

2.4 Novelty

Clearly metaphoricity depends on language use rather than timeless properties of sentences. There is a difference between the first use of a new metaphor and the re-use of an established one. First uses are rather more difficult to process as they involve essentially rendering another sense for an existing predication.

(9) Leslie washes books.

(10) Leslie is a fox.

It is an accepted metaphorical sense of (10) that allows the sentence to be used to express that Leslie is clever.

² By “implicative complex” we mean just the set of sentences that pertain to some expression — the set of sentences implied by an expression (when it’s a sentence on its own), the set of sentences that imply it, etc.
However, in a context in which (9) is literally false, additional information is required to make the sentence interpretable. There are any number of scenarios that render the sentence metaphorically apt, one of which is that Leslie copy edits manuscripts of books. Once that extension is made, it is readily possible to re-use that sense. The first use can be quite difficult to obtain, and it is claimed that there are syntactic constraints on where new metaphors can be constructed that are distinct from constraints on re-use of existing metaphors (Vogel, 1998).

(11) Sal washes newspaper articles.

Moreover, it is necessary to account for the fact that eventually, novel metaphors become so entrenched in everyday use that they cannot be discriminated from expressions whose interpretation is intended to be literal. By now “fox” as nonliterally used in (10) is close to being a dead metaphor. Dead metaphors are ubiquitous in language. It is necessary to have a succinct model of the potential for transition from novel use to accepted metaphor to dead metaphor.

2.5 Semantics-Semantics Interface

Important to a theory which satisfies the above constraints is that it integrate the interpretation of metaphor and other nonliteral language (whose context change potential and truth conditions are of primary interest) with the interpretation of literal language. While the different uses of language can be discriminated in some sense within an overarching system. It is inappropriate to have one mechanism for literal language and an altogether different module for dealing with nonliteral language. The reason for this is suggested by the preceding section: it has often been demonstrated that language coordination isn’t often by explicit negotiation but by use and mimicry (Garrod and Anderson, 1987; Healey, 1995). This (and popular perceptions that prescriptive linguistic institutions ultimately fail) suggests that the primary mechanisms for literal language ontogenesis are closely tied to the creation and death of metaphor. If literal language springs from the nonliteral, then it is the literal that is “deviant” if either is. “Deviance” is to be the wrong mode of expression here: it is more satisfying to have a single framework in which both literal and nonliteral language are handled equally but discriminated in the important senses than to set up systems in which semantics is done on literal language and only some other processing on nonliteral language.

3 A Critique of Recent Proposals

We contrast two recent proposals for integrated semantic analysis of literal and nonliteral sentences in formal semantics.

3.1 Intensional Dynamic Semantics

3.1.1 Overview

Vogel (1999) presents an intentional predicate calculus as a meaning representation language for both literal and nonliteral expressions. The language has greater than first order expressivity in that it admits predicate polysemy, where each sense of a predicate corresponds to a corresponding word sense. This is a very weak extension of first order logic, though, as it amounts to being able to index predicates to enumerate their meanings (Bank$^1$ is a financial institution, Bank$^2$ is the effluvia of a body of water, ...). It is a real extension, nonetheless, as it requires a more complex semantics that provides an index for the characteristic set of individuals satisfying the predicate in each of its senses. Some indices are classified as literal, and others are classified as nonliteral. Indices can be referred to directly within the language, but reference to indices isn’t essential for syntactic or semantic well-formedness. Underspecification of indices simply results in ambiguity. New indices can be created, and new tuples can be added to their characteristic sets. Vogel (1999) provides one set of constraints on this process that restricts where characteristics can be extended. Once a characteristic set is extended, the newly resulting model provides the context of interpretation for subsequent discourse. Thus there are two ways in which a classical predicate logic is extended. The first is to address polysemy. The approach here is to make the system weakly intensional—direct reference to indices is possible in the language but not necessary; no constraints are placed on the multiplicity of senses. The second issue is that the system is given dynamic interpretation. The interpretation function must be examined both before and after the interpretation of sentences. Some sentences have the capacity to extend the function, and this extension is passed on to the interpretation of subsequent discourse.

3.1.2 Critique

Compositionality. As presented by Vogel (1999), this system treats metaphor as a mode of expression distinct from simile. Metaphoricity comes from distinguishing the sense of the predicate. In a way, this reduces metaphoricity to polysemy with a preference ordering on senses of expressions: new uses are most metaphorical, nonliteral but old ones admit new tuples into their remit, old uses are deemed literal. The system presumes a translation function that maps natural language sentences into the very rich meaning representation language and at the point of translation introduces ambiguity: no stipulations are given on how parts of natural language syntax guide the interpretation into sense selecting expressions or deixis. However, once translated, the sentences are fully distinct from related simile. The “hidden” meaning of the metaphor is just the pointer to the particular sense at stake. In this framework, metaphorical meaning is thus modeled exten-
sionally.

Truth Conditions. In this system a predicate can be false relative to one sense and true relative to another, whether those senses are classified as literal or nonliteral. Whether the exact truth conditions proposed are correct is subject for debate.

Aptness. The theory says nothing about aptness, apart from supplying a way for the metaphorical sentence to be nonliterally true, and reducing that truth to extensiality. What the system lacks is a way of clarifying what other predicates require extension, given that one has extended one. It is clear that the sort of mechanism that would work in this context is one that examines the web of implications that a predicate participates in, and on the basis of structural analogy maps those predicates to predicates corresponding to the analogical domain. More has to be said about this interface, but it is clear that this exactly the sort of theory that has been worked out by Veale and Keane (1992) in the context of network encodings rather than first order encodings.

Novelty. Ontogenetic uses of metaphor are distinguished from re-uses of existing senses for predicates. Shift of senses is modeled by reclassification of indices as literal or nonliteral, however no constraints are placed on this mechanism besides the basic classification. The precise syntactic (predicate form) and semantic (literal falsity of the predicate) constraints on first use of a metaphor generate empirical claims that require testing.

Semantics-Semantics Interface. Because all senses of expressions are extensionalized as characteristic sets of predicates at indices, literal and nonliteral expressions are handled within the same overarching framework, with a difference in precise function corresponding to the classification of indices at stake as literal or nonliteral.

3.2 Type Theoretic Semantics

3.2.1 Overview

In van Genabith (1999) a standard type theoretic approach is employed to provide an analysis of metaphors as reduced similes (cf. Davidson (1984) and discussion above). On this account (10) is translated as Leslie and the set of all foxes share a common property. Sense extension is accounted for indirectly in that the common property includes at least the extension of Leslie and the set of all foxes. However, this simple-minded approach is easily trivialized by the universal property (the property of being identical to oneself). The translation is strengthened by requiring that the property sought be non-trivial. The type theoretic representation is obtained compositionally (Montague, 1973). The approach captures both direct copula constructions and more complex metaphors involving other predicates (such as sentence (9)). A Prolog implementation is provided.

3.2.2 Critique

Compositionality. Compositionality is one of the motivating factors for this approach. van Genabith (1999) provides a syntactic fragment and corresponding semantic interpretations for each rule in the fragment. Each sentence generated by the fragment is ambiguous between a literal and a metaphorical translation which interprets a metaphor as a corresponding, reduced simile, as discussed above.

Truth Conditions. The truth conditions are classical. The system derives its power from the translation. Given a metaphor, the corresponding simile translations augmented with a non-triviality constraint come out as contingent (either true or false).

Aptness. Like the approach of Vogel (1999), this framework relies on the existing literature on metaphor recognition to determine what counts as a good metaphor. The approach offers an initial idea towards simile property instantiation (i.e. property resolution). It remains to be seen whether this scales up to more complex examples.

Novelty. This theory was formulated with compositionality and interface to other semantic modules as its primary concern. It does not address issues of fossilization. The system is like classical logic in being completely static. The re-use of metaphor isn’t distinguished from first use, but is distinguished from literal language.

Semantics-Semantics Interface. The formulation offered by van Genabith (1999) satisfies this desideratum because that was it motivating concern. The same mechanisms underly the literal and nonliteral interpretation of sentences. What discriminates the two interpretations is precisely the syntax semantics interface—the choice of translation rules.

4 Discussion

This abstract offers a set of criteria for a semantic theory for metaphorical uses of sentences. We have described two theories that offer compositional denotational semantics to metaphors, something that other theories of metaphor interpretation lack.

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References


Flowers, Vegetables, Fruits and Weeds: A Metaphorical Approach

Mariana Neagu
University of Galați, Domnească Str., No. 47, 6200-Galați, România
mneagu@nil.ugal.ro

Abstract
In this paper we support the idea that metaphor is conceptual in nature by analysing the basic level objects, properties and actions involved by the category PLANT as they are conceptualized by two different languages such as English and Romanian.
Relying on theoretical concepts like cross-reference mapping (Lakoff, 1987, 1993), semantic distance, source/vehicle field, target/topic field, ground (Goatley, 1997), evaluative/attributive features (Warren, 1992), we try to demonstrate that THE HUMAN IS A PLANT CONCEPTUAL METAPHOR is a common pattern in both the English and the Romanian lexicon.

1. Introduction

In cognitive terms a metaphor is a mapping (or conceptual correspondence) of the structure of a source/vehicle model onto a target model. In the process of cross-reference mapping, the mapping or correspondence takes attributes of the first domain (the source domain) and highlights or perspectivizes certain attributes of the second domain (the target domain).

There are instances when the source category is composed of other basic level object categories, properties and actions. Starting from these components we will identify and discuss the basic constituent mappings (submappings) of the PLANT category. In doing this we adopt a non-classical categorization view and maintain that cognitive structures operative in the mental lexicon include common-sense or folk knowledge, culture-specific knowledge and encyclopedic knowledge.

Mappings or conceptual correspondences usually follow a subconscious pattern of comparing items from different domains which share some minor but obvious characteristics. These shared features make up what is traditionally called Ground.

Following Warren (1992:19) we distinguish between Grounds containing criterial or defining features of meaning (which serve to identify referents and which are important for categorization) and Grounds that have the character of being evaluative-attributive features (which serve to indicate the encoder’s attitude towards the referent). As we will see, it is above all among slang metaphors that we find examples of the latter type of Ground.

In terms of the semantic distance between the Vehicle semantic field Plant and the Topic field Human, the conceptual metaphor THE HUMAN IS A PLANT is an analogical transfer situated on the first cline of metaphoricity. Therefore, the metaphor under discussion belongs into the group of concretizing metaphors and, as can be noticed in Figure 1, it is a slightly distant transfer metaphor because we have to travel up through two nodes from the Vehicle semantic field ‘plant’, before descending to the Topic field ‘human’ (Goatley, 1997: 39)

```
    concrete   abstract
   /        \        /
living    non-living
    /  \     /  \  
animal  plant  natural artefact
  /  \    /   \  /
animal  human
```

Figure 1.

In order to better understand the way in which conceptual correspondences work we will approach the HUMAN–PLANT metaphor in terms of these basic constituent mappings or submappings:

a. PARTICULAR HUMANS = KINDS OF PLANTS/FRUITS
b. PROPERTIES OF HUMANS = PROPERTIES OF PLANTS
c. ACTIONS ON/OF HUMANS = ACTIONS ON/OF PLANTS

2. Metaphors for particular humans

Looking at the verbal expressions of the first conceptual metaphor, i.e. PARTICULAR HUMANS = KINDS OF PLANTS/FRUITS, we notice that to the same referent corresponds different lexicalizations in the two languages. So, an attractive young woman is referred to as a peach (of a girl) and un bujur de fructă (literally ‘a peony of a girl’). Romanian slang terms which denote an attractive young girl include trufanda (lit. ‘early vegetable’) and aguridă (lit. ‘early fruit’); the ground for both metaphors relates to ‘unripeness’, a criterion or defining feature of meaning.

As mentioned earlier, not infrequently, the Ground consists of evaluative–attributive features of meaning which show the encoder’s attitude towards the referent. One case in point is ‘worthless person’ denoted in English by lemon, rotten apple, small potatoes (colloquial American English) and in Romanian by muratură (lit.‘pickle’), pleavă (lit.‘calf’), and poamă (dialectal form for the literal ‘fruit’). Obviously, the encoder’s attitude towards the referent is disdain and the Ground relates to impact or value: rotten apple – Ground: similar degree of impact small potatoes – Ground: similar degree of value

The examples we have mentioned in English and Romanian denote the idea that flowers, fruits, vegetables, etc. are evaluated and assume different degrees of importance in our eyes, i.e. subjective judgements explain the different lexicalizations in the two languages analysed.

There are instances in which plant metaphors in one language are not paralleled by metaphors from the same domain in the other language. For example, gooseberry ‘unwanted third person present when two lovers want to be alone together’ has no such equivalent in Romanian. The figurative sense of gooseberry is encoded by the Romanian idiom a cîinea roată la carucă (lit. ‘the fifth wheel of a cart’) which is based on a Ground made up of the features /unnecessary/ and /hindering/.

Similarly, the Romanian iederă (lit. ‘ivy’) and liană (lit. ‘liana’), denoting a possessive, profiteering woman, have no such counterparts in English.

Besides, Romanian slang terms denoting body parts seldom have English correspondents from the subdomains of vegetables and fruits (the exception is Adam’s apple). So, the Romanian derogatory slang metaphors for ‘head’ are dovleac/bostan (lit. ‘pumpkin’), târtăciuţă (lit. ‘squash’), gule (lit. ‘turnip cabbage’). Similarity of shape characterizing the above mentioned metaphors may combine with similarity of size as in fasole (lit. ‘beans’) for teeth, cepe (lit.‘onions’) for eyes and foi de varză (lit. ‘leaves of cabbage’) for ears. The last phrase is comparable with the English cauliflower ear ‘ear that has become swollen after repeated blows, e.g. in boxing’.

3. Metaphors for properties of humans

Concerning the second submapping, PROPERTIES OF HUMANS = PROPERTIES OF PLANTS, we argue that there are more similarities than dissimilarities between the English Vehicle terms and the Romanian ones. Cases in point are bushy moustache/eyebrow, stubby beard/chin, gnarled fingers/hands, withered face.

The property ‘lack of consistency’ (of fruits) is transferred to the domain of humans to refer to their temper, state, character, behaviour (e.g. mellow, rotten):

(1) I’ve seen him grow more mellow over the years.
(2) She was feeling rotten, in bed with a hot-water bottle.

The English term rotten and its Romanian equivalent purtat need some comment about their metaphorical adverbial use as intensifiers; in both languages the meaning is ‘to an extreme degree, absolutely:

(3) I’m most rotten certain about that.
(4) La vremea aceea era purtat de bogat.
(At that time he was rotten rich).

Quite interestingly, the vegetation domain provides some other terms used as metaphorical intensifiers in Romanian. Consider, for instance, some expressions containing such intensifiers a bate măr, (lit ‘beat apple’) ‘give a sound beating’, a sta smirnă (lit. sit myrrh) ‘sit motionless’, a dormi buştean (lit. sleep log) ‘sleep like a log’.

We believe that in colloquial Romanian intensifiers denoting basic level entities are more common than in English. In support of this we can mention expressions containing the term foc ‘fire’: frumoasă foc (lit. ‘beautiful fire’), very beautiful, indrăgostit foc (lit. ‘in love fire’) ‘deeply in love’, gelos foc (lit. ‘jealous fire’), very gelous, suprăfior foc (lit. ‘angry fire’) ‘very angry’.

4. Metaphors for actions on/of humans

The submapping showing most similarities at language level is the third one, ACTIONS ON/OF HUMANS = ACTIONS ON/OF PLANTS.

A case in point for ACTING ON HUMANS = ACTING ON PLANTS is the verb mow in the phrasal verb mow sb. down and its Romanian counterpart castră which are used metaphorically to refer to the killing of people in large numbers as if by making a sweeping movement. We believe that the type of Ground implied by this metaphor is similarity as to implicature.

Nevertheless there are instances in which the same verb (e.g. plant) expresses different meanings in the two languages. In English it has a metaphorical meaning when used in the passive or transitively with reference to bombs, microphones, informers (5) while in Romanian
planta has a literal meaning when used transitively and
a metaphorical one when it is intransitive (6);
(5) The CIA had planted its agents and informers in
all the strategic areas.
(6) Se plantase în fața mea frâș ili scoață o vorbă.
He had been planted in front of me without
uttering a word.
The same happens with the verbs transplant, train
and uproot for which the intransitive shift is a marker
of metaphorical use:
(7) Adults are not flexible, they do not transplant
comfortably to another place.
(8) She uprooted herself from the farm and moved to
London.
With some verbs such as crop, trim, sprout, the
syntactic configuration is the same for both literal and
metaphorical uses: crop the grass, trim the hedge,
grow and crop one's hair, trim one's hair, beard,
moustache. The verb sprout can be followed by a direct
object (9) or an adverbial (10):
(9) Tom has sprouted a beard since we saw him last.
(10) Abundant hair sprouted from his broad chest.
The conceptual metaphor ACTIONS OF
HUMANS = ACTIONS OF PLANTS can be better
understood if we reword it as THE LIFE CYCLE OF
HUMANS = THE LYFE CYCLE OF PLANTS. So, it
is natural to find out that, to any stage in the growth of
a plant corresponds verbal expressions which develop
identical or similar metaphorical meanings in the two
languages: put down roots 'become settled or
established'- a prînde rădăcini; sprout 'begin to grow
or appear (about hair, beard) - a crește; bloom/blossom
'develop an attractive quality, e.g. beauty' - a înflori;
vegetate 'lead a bare existence' - a vegeta;
(11) Instead of blooming into further beauty she
became pale and sad.
(12) Many elderly folk vegetate and die in loneliness.

5. Linguistic aspects of Vehicles

Throughout the paper we used the terms 'lexicization', 'verbal expression' as synonyms of
'linguistic realization', 'metaphoric expression',
'linguistic metaphor'. We believe that any of the terms
used is acceptable to refer to an instantiation of a
conceptual metaphor or root analogy.
Researchers concerned with the nature of metaphor
in language showed that the main difference between
conceptual metaphors and linguistic metaphors is that
conceptual metaphors must always have both Topics
and Vehicles (e.g. the Human = the Topic, the Plant=
the Vehicle) while with linguistic metaphors, the
Vehicle is the only obligatory element, expressed either
explicitly or implicitly.
Vehicle terms can be found in any major word-class:
nouns (section 2), adjectives and adverbs (section 3),
verbs (section 4). In terms of their expressive force,
noun metaphors seem to be the most powerful, then
come verb metaphors, while adjectives and adverbs are
the least forceful (Goatley, 1997:83).
In what follows we will discuss vehicles in point of
word formation devices.

5.1. Nouns, noun phrases and compounds

A close look at the metaphors for particular humans
and human body parts points out that vehicle terms vary
in length from simple lexical items, to noun phrases and
compounds.
Comparing simple metaphor nouns in English and
Romanian we notice different lexicalizations for the
same meaning. For instance, the metaphorical meaning of
cabbage, i.e. 'dull inactive person' is encoded in
Romanian by two terms with a general meaning, legumă
(lit. vegetable) and planta (lit. plant).
If we further compare the metaphorical meanings of
planta', inactive person' and plant'informer', we note the
conceptual difference which also characterizes the
corresponding verbs.
Nevertheless, there are some instances when there is a
perfect correspondence between the figurative use of a
term and its Romanian counterpart. A case in point is
flower (R. floare), one of the few plant terms having a
rhetorical usage:
(13) The generation which lost its finest flower in the
First World War.
(NSOED, I, 982)
(14) Toața floarea cea vestită a întregului apus.
(DLRCL, II, 305)
'All the famous flower of the whole West'.

Noun phrases and compounds are a frequent
lexicalizing device in English, especially with metaphors
for particular humans. Aside from the apple of one's eye,
almost all terms imply negative connotations in a
looser or greater extent: wall flower, shrinking violet, couch
potato, bean pole, apple polisher, grass widow.

As can be noticed, noun Vehicle terms are based on
imagery which is an intermediate category between
direct experience and conceptualization. Goatley
(1997:83) rightly assumes that images are more
individually ideosyncratic and closer to the tokens of
actual experience. They are more contextualized and
associated with episodic memory, the memory of events.
We conclude this section by saying that unlike in
English, in Romanian noun phrases and compounds are
very seldom used as linguistic realizations of the
conceptual metaphors discussed in the second section
Being an inflecting language, Romanian uses more
affixation that we will discuss in the next subsection.

5.2. Derivational processes

In Romanian there is a whole set of denominal verbs
involving metaphor in their meaning which are derived
from plant nouns. The verbs generally mean 'resemble
the flower, vegetable, fruit, denoted by the noun:

CONCERNING ROMANIAN METAPHORS IN LANGUAGE
argued that Romanian, being an inflecting language,
makes little if no use of these lexicalizing devices to
instantiate metaphors for particular humans.
With metaphors for properties of humans and
metaphors for actions of/humans we saw that the
verbal expressions in the two languages resemble more
and stylistically they are not slang or colloquial but
mainly formal usages. This implies that adjective-
Based metaphors and verb-based metaphors are

Study of the Development of Slang Senses and Novel
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Wiksell International
HUMANS ARE SUPERIOR TO ANIMALS: THE CULTURAL CONCEPT THAT UNDERLIES THE USE OF ANIMAL METAPHORS IN CHINESE

Huei-Mei Tsai
Graduate Institute of Linguistics, National Taiwan University
e-mail: r6142006@ms.cc.ntu.edu.tw

Abstract

The metaphor that “animals are humans” is probably a very common metaphorical process in the languages in the world. In this paper, we examine the metaphor that “animals are understood as humans” found in Chinese and English and see how they are differently structured. We find that in addition to having the Invariance Hypothesis to account for the use of animal metaphors, metonymies involved in the metaphors must also be taken into account so that the whole picture of the animal metaphors can be justifiably construed. We illustrate that in Chinese, the cultural concept that “humans are superior to animals” is more evident in the use of animal metaphors than in English. This underlying cultural concept results in the metonymy that most animals stand for “brutality, no good or lack of reasoning.” The deep-rooted cultural concept can be evidenced from the use of Chinese animal metaphor idioms, which embody many of Chinese thoughts. Animal metaphors of more colloquial use also lend support to the cultural concept. Finally we point out that in artificial intelligence, the cultural concept has to be considered in building computer programs capable of story comprehension and other kind of linguistic processing.

1 Introduction

Metaphor and metonymy used to be considered figures of speech used exclusively in literature for rhetorical effects. But with the book of Lakoff and Johnson in 1980, *Metaphor We Live By*, it is realized that in fact metaphor and metonymy abound in our life and it is believed that it is metaphor that constrains our thought and language. Metaphor is resorted to when something which is more abstract is expressed in terms of something or concept which is more concrete or accessible. The former is called target and the latter source. The process of mapping one abstract domain to another concrete domain is called conceptual metaphor because it is processed in the image schema. Metaphors like TIME IS MONEY, ARGUMENT IS WAR and LOVE IS A JOURNEY are all very common ones in our everyday life and we construct and talk about our ideas about time, argument and love by thinking of them as money, war and a journey which are more concrete and accessible. Take the conceptualization of love as an illustration. We may talk about love in the following ways (Lakoff, 1990):

> The Invariance Hypothesis: Metaphorical mappings preserve the cognitive topology (this is, the image-schema) of the source domain.

Metaphor is a relation of similarity while metonymy is a relation of contiguity. Metonymy is a stand-for relationship under an idealized cognitive model (Lakoff, 1987). Kovecses and Radden in 1998 pointed out that “Gibbs (1993) has accumulated psychological evidence that the figurative meanings of tropes are often recovered without resorting to defective literal meanings and may even take less processing time.” They gave an example by Ogden and Richards (1923:9) that “we say that the gardener mows the lawn when we know it is the lawn mower which actually does the cutting.” Kovecses and Radden called this metonymic relationship between the gardener and the lawn mower as CONTROLLER FOR CONTROLLED. They identified a very complete list of metonymic relationships. We now illustrate two of them: (Kovecses and Radden, 1998)
human being is the most intelligent among creatures. In English, the similar concept is also found: *Man is the lord of creation*. Another similar old saying in Chinese also conveys the same concept "xin xin nen ian, bu li qin sho" (Though a chimpanzee is able to talk, it is still an animal.) Surveying the Chinese expressions and English ones, we find that the concept is established in both languages but we will argue in this paper that it is even more evident in Chinese expressions. The superiority complex of Chinese people over animals is reflected in their use of language and the better aspects of animals thus are unduly ignored. Instead, the brutality and lack of reasoning of animals are over-emphasized.

The Chinese idiom, termed as Chengyu (meaning conventionalized expressions) in Chinese, is mainly composed of four characters, with each character with an independent meaning. The vast bulk of the Chinese idioms are condensed form of a complete idea or proposition which may come from famous historical events, literary works, etc.. People are not able to use or understand some of the idioms, especially the one that has a historical background unless they take time to learn them. In this regard idioms are of more literary use than of colloquial use. We take Chinese idioms as part of our data corpus partly because cultural concept of a people can be observed more faithfully from the records of the literatures. And it is partly because we think that once Chinese people learn the idioms, when they use or comprehend the idioms, they still have to go through the analogical reasoning process as they do with the conceptual metaphor like LOVE IS A JOURNEY. As Lakoff (1990) put it in the following:

Many of the metaphorical expressions discussed in the metaphor literature are idioms. On classical views, idioms have arbitrary meanings. But within cognitive linguistics, the possibility exists that they are not arbitrary, but rather motivated, and conceptual metaphor can be one of the things motivating an idiom.

With the conviction that idioms require the same conceptual process to map one image onto another, we take the Chinese idioms as part of our corpus to illustrate that the deep-rooted cultural concept "human are superior to animals" can be evidenced from the metaphor HUMANS ARE ANIMALS.

In the second section we first examine Chinese idioms and find that some animal idioms are unduly ascribed with unduly negative connotations. Then we look at some animal metaphors of more colloquial use

1 It will be abbreviated as "HUMANS ARE ANIMALS" in the following text.
2 This idiom is found in Shujin, a Chinese classical work of very old Chinese.
and find the same phenomena. In the third section we take some examples from English as comparisons. In the fourth section we conclude our discussion.

2 The animal metaphors in Chinese
In stories, movies or cartoons, animals are often attributed with human traits, such as language and reasoning ability. This is called personification. Not uncommonly, humans are also in turn attributed with animal traits, such as the behavior and the appearance of animals. We take about one hundred and twenty idioms containing at least one trait of animals in each idiom, with the animal representing the image of the human, from a Chinese idiom dictionary, which collects idioms of common use. Although the one hundred and twenty animal idioms we take can be anything but exhaustive, they are very representative. Most of the animal metaphors have negative meanings. Let us take one idiom for example, as shown in (3).

(3) zou jian zi fu
make cocoon self tie
“(said of a silkworm) to spin a cocoon and imprison itself in it”

This idiom talks about the behavior of a silkworm and maps this image onto the behavior of a person as if he tied himself with a cocoon like a silkworm. The metaphorical meaning is that a person ties himself up with duties: to get into trouble by one’s one schemes.

In (4) and (5), we give another HUMANS ARE ANIMALS metaphors.

(4) zhan ya wu zhua
open teeth wave paw
“(said of wild beasts) to fright people by showing the fangs and flourishing the paws”
(5) jian niau zhi huan
weary bird know return
“The weary birds always return to its nest.”

Example (4) and (5) are all behaviors of animals. In (4) the paws “zhua” are names exclusively used for the part of animals. When the image of (4) is mapped onto humans, it means that an angry person curses and flourishes his hands like a fierce animal. Example (5) means that a person returns home after years of wondering just like a bird.

Example (6) and (7) describe the appearance of a person in terms of the images of the animals.

(6) jiou mian hu xin
pigeon face swan figure
“having the face of a pigeon and the gaunt figure of a swan”
(7) xiong iau hu bei
bear waist tiger back
“the waist of a bear and the back if a tiger”

Example (6) maps the appearance of the birds onto a gaunt and emaciated man. Example (7) takes the appearance of a tiger and a bear to describe a person with a heavy and muscular build of the body. All these examples refer to humans as animals and when describing people in this way, we process the images of humans in terms of animals metaphorically.

All the above examples faithfully map the behavior of an animal onto the behavior of a person and the appearance of an animal onto the appearance of a person. This accords well with Invariance Hypothesis, as shown in (8). (Ahrens and Say, 1990).

(8) Appearance ..........> Appearance

Behavior ..........> Behavior

SOURCE TARGET

DOMAIN DOMAIN

However there are some cases that cannot be explained simply with the Invariance Hypothesis, as is exemplified in (9), (10), (12) and (13) and (14).

(9) jian zuie ho sai
pointed mouth monkey cheek
“having the pointed mouth and the cheek of a monkey”
(10) ing ing ian ian
oriole oriole swallow swallow
“a group of orioles and swallows”
(11) ing shen ian yu
oriole voice swallow sound
“the voice of orioles and swallows”
(12) hui chang san chi
beak long three feet
“having a beak three feet long”
(13) go tou jun shi
dog head military leader
“having a dog as the military leader”
(14) niou tou ma mian
cow head horse face
“having a cow’s head and a horse’s face”

Example (9) does not simply describe the appearance of a person metaphorically, it carries the connotation that the person in question must be mean in nature. Example (10) is an example of the combination of metonymy and metaphor. The defining feature of orioles and swallows is their voices. Here is a metonymic example of CATEGORY FOR DEFINING FEATURE. The voices of the birds are then mapped onto the voices of a group of women chattering together pleasantly. This is a case of behavior to behavior mapping, but things are not so easy. Idiom (10) has the negative implication that these women are prostitutes. Orioles and swallows are unduly ascribed with the negative connotation in this case. We have a similar
idiom in (11), which also describes the soft voices of women but which does not necessarily have bad connotation. In example (12) “huel” is a word used for the beak of a bird. The beak of a bird corresponds to the mouth of a person, which metaphorically stands for the speaking ability. But again example (12) is not simply a correspondence of appearance to appearance; it carries the connotation that the person is fond of exposing other people’s secrets and faultfinding. Example (13) means having a person, who has no judgement, like a dog, as a leader. Here we may say that dog is used metonymically for the category of animals which are characterized as having no reasoning ability. This is another metonymic example of MEMBER FOR THE CATEGORY. In (14), the cow’s head and the horse’s face are mapped onto people, meaning that these people are like cow and horse in appearance. In addition, it has the connotation that these people are fierce and mean. In Chinese, simply looking like animals in appearance can mean that the persons referred to must be no good. In fact if a person is considered no good, he can be mapped onto any fierce animal’s face. Example (14) happens to become conventionalized.

The meanings of example (9), (10), (12) and (13) and (14) would not be complete without referring to the Chinese cultural concept that “humans are superior to animals” and “animals are embodiment of brutality, no good and lack of thought and reasoning.”

In the following, we take example (12) to illustrate that “Invariance Hypothesis”, “metonymic relationship” and the underlying “cultural concept” must be considered all together so that the connotation of the animal metaphor can be rightly deciphered.

---

**Figure 1**

Beak $\leftrightarrow$ Mouth

Invariance Hypothesis

Animal domain $\leftrightarrow$ Human domain

---

**Figure 2**

Speaking ability $\leftrightarrow$ Speaking ability

Metonymic relation

Animal domain $\leftrightarrow$ Human domain

---

5 Here the member is the dog and the category is the beast.

---

**Figure 3**

It is true that some animals in Chinese culture have prestigious positions, such as “horse” and “dragon” and “phoenix”. But except for the imaginary animals “dragon” and “phoenix" which have only good implication, most other animals, when used in linguistic expressions mapped onto humans can have negative connotation. The cultural concept of Chinese people underlies their embodiment of people of no reasoning and thought as animals. We may say that for this reason, “brutality, lack of thought” and “no good” are potentially defining properties of animals in the Chinese cultural concept. Consequently, animals are often used metonymically to stand for “brutality and lack of thought” as a metonymic example of CATEGORY FOR DEFING FEATURE in Chinese. Therefore, when they are mapped onto humans, derogatory implication is always involved.

The evidence that cultural concept of Chinese people that “humans are superior to animals” can also be drawn from the large volumes of fables told by loyal subjects to their misguided lords. The subjects told the stories with animals to hint to the lords that what the lords did was wrong because the lord were wiser than the animals in stories to make the wrong decisions and judgements. The animals in the stories were personified as people and sometimes as the lords themselves and have the same situations as the lords did. This is called parable. We take such an idiom as an illustration, as shown in (15).

(15)  **yu ban xian cheng** (yuong de li)

snipe clam each other fight (fisherman get the profit)

“the fight between the snipe and the clam (with ending up as captives of the fisherman)”

The story means metaphorically that the fight will only benefit the third party. A classical work writes that Country Zhou was going to invade Country Yan and Sudai told king Hue for Country Yan that “I came today and passed by the river Yi. The clam had just came basking under the sun. The snipe pecked at it and the clam shut itself up and hold the snipe’s mouth. The snipe said that “if it does not rain today, if it does not rain tomorrow, there will be a dead clam.” The clam also told

6 We use the word “potential” because some animal metaphors are positive although most are negative.

7 Here the category is the animal and the defining feature is “no good, brutality or lack of reasoning.”

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124
the snipe that “if you do not get out today, if you do not get out tomorrow, there will be a dead snipe.” Both parties refused to give in. A fisherman came and took them.”

In this story, the subject Sudai identified the king Huei as either the snipe or the clam. If the king insisted on fighting, he would end up miserably as the snipe or the clam and benefit the third party. If the king Huei were not that stupid and thoughtless as the snipe or the clam, he would not invade Country Yan. Nobody wants to be like the snipe or the clam which are inferior in Chinese people’s eyes. Many subjects admonished their lords by using animals in their analogies and hoped that the kings would be wise enough to take the hint that they would be like or even worse than animals if they did not act more wisely than the animals in the story. Again it is the idea that “humans are superior to animals” that brings about so many such animal stories and idioms.

After talking so much about Chinese idioms, we also draw some colloquial animal metaphors used in daily life. We can find that most of these metaphors are also derogatory when mapped onto humans and in fact this phenomenon is even more evident in daily colloquial use.

It is observed by Ahrens and Say in 1999 that the appearance of an animal maps from the source domain of animals to the target domain of humans in Chinese, but only body parts are allowed to map. They gave some examples as shown in (16)-(18):

(16) ni kandao na jiahuo na zhang ma lian you see that guy that CL horse face "Did you see the long face of that guy?"
(17) bie ku le, dou ku cheng qinyu yan le NEG cry PT all cry ASP goldfish eye ASP "Don’t cry, your eyes are all big and red.”
(18) ta ting le ting hubei s/he stand ASP stand tiger back "S/He straightened his/her strong back.”

They argued that “horse face”, “goldfish eye’s”, “tiger back”, all indicate the specific body part of the animal that is being referred to. The specific body part then maps onto the person’s body. So for example, a person with a “horse face” has a long, thin face, and a person with a “tiger’s back” has a strong back.

After the appearance part, they went on to argue that salient (or characteristics attributed to a certain behavior) of animals are also mapped from the source domain to the target domain, as exemplified in (19) (from Ahrens and Say in 1999) and (20).

(19) ni zhen shi yi zhi zhu you really be one CL pig “You are really a pig.”
(20) ta shi zhi lau hulij he be CL old fox “He is very crafty”

They explained that pigs are thought to be lazy and by extension, stupid by Chinese people and a fox very sly and crafty. Therefore when they are mapped onto humans, the humans being referred to have the same behaviors as the animals. With the demonstration of examples like (16)-(20), Ahrens and Say supported the Invariance Hypothesis in (8).

But we think what they stated is not enough to show the real picture of the animal metaphors used by Chinese people. As pointed out in Huang in 1994, in Chinese and English, cross-linguistically nouns and verbs are slightly differently structured, with the former tending more frequently to exploit metonymies for sense development and the latter more likely to have recourse to metaphorical mappings for sense extension. From Chinese idioms, we can see that many of them contain both metonymies and metaphors. It is not surprising that in the animal metaphors in everyday use, metonymies are also involved. For example, the defining feature of a fox’s behavior is its craftiness, so we take a fox to stand for craftiness, as an example of CATEGORY FOR DEFINING FEATURE. Then the fox is mapped onto humans with the crafty nature. The explanation also applies to the metaphor of a pig.

In examples (16)-(18), Ahrens and Say said that the body part of the animals is correspondingly mapped onto the body part of the humans and in this way the appearance of humans can be imagined through the animal metaphor of appearance and that’s all. But we find that this is not simply a matter of appearance to appearance mapping. The fact is that a certain part of an animal can also be mapped onto human’s behavior instead of appearance, through the work of the metonymy and cultural concept. We demonstrate some examples in (21)-(13).

(21) ni zhe ge go tuei you this CL dog leg “You such a henchman”
(22) ni zhen shi zhi wuya zuei you really is CL crow mouth “You are really a ill-wisher.”
(23) ni zhe ge zhu nau you this CL pig brain “You are such stupid”

In example (21), “go tuei” means the “leg(s) of a dog” but it is not used simply to refer to a person’s leg. Here a metonymy is at play. The dog’s leg is used to metonymically stand for the dog as an example of part-for-whole metonymy8. A dog is known to be very faithful but when his brutality is taken into consideration, he is thought to have no judgement. In this case dog’s leg’s stand(s) for the dog and then the source domain of the dog is mapped onto the target source of a person. Therefore “go tuei” is a person who slavishly does legwork for others and has no judgement of his own.

8 Here the dog is the whole and the leg is its part.
"wuya zuei" in (22) stands for the mouth of a crow. A crow is considered ill-boding by Chinese people. The mouth of a crow stands for the speaking metaphorically. Then the crow’s mouth is mapped onto the mouth of a person metaphorically. In this way it still follows the Invariance Hypothesis. But we must remember that a crow brings bad message so when a person is a “wuya zuei”, he says something that is not pleasant to hear. In (23), “zhu nau” means the brain of a pig. Following the Invariance Hypothesis, the brain of the pig is mapped onto the brain of the human. A pig is considered stupid by Chinese people so the “zhe nau” used to stand for a pig metonymically in turn stands for “stupidity”. The above three examples all contain the body part of the animals but they do not simply represent the corresponding part of the humans, metonymy and the cultural concept of the Chinese must be brought into play. Therefore when construing the animal metaphors, the cultural concept that “humans are superior to animals” must be taken into account. Next time when you are called with an animal’s name, chances are that you are degraded and ridiculed.

Generalizing from the animal metaphors mentioned above in Chinese, we can find that animals stand for “brutality, no good, lack of reasoning”, and in turn individual animals, like the dog and the pig, can stand for animals metonymically as an example of MEMBER FOR THE CATEGORY. The body part can in turn stand for the individual animal. In other words, body parts of animals can stand for “brutality, no good and lack of reasoning” in Chinese.

3 The animal metaphors in English

In English, the concept that humans are the creation of the lord or the humans are the wisest of all creatures also exists. We do a preliminary survey of English to see if animals, when mapped metaphorically onto humans, are imputed with unduly characterizations as those in Chinese, such as (9), (10) and (12).

One very different point of animal metaphors of English from those of Chinese is that the body parts of the animals are not used to metonymically stand for animals (Ahrens and Say in 1999). Like animal metaphors in Chinese, animal metaphors in English also follow the Invariance Hypothesis: the appearance of animal domain is mapped onto the appearance of human domain and the behavior of animal domain is mapped onto the behavior of human domain. But the predominant numbers of animal metaphors in English project a specific animal’s overall size image, overall physical image or typical or unique behavior of the animal in question onto a person having the same image or behavior. The following examples illustrate the appearance of the animal mapped onto humans. The interpretation is in parenthesis following the metaphorical usage. (Ahrens and Say, 1999)

(24) She is a cow. (She is fat.)
(25) She is a fox. (She is attractive.)

From (24), we can see that a person is metaphorically a cow because she is physically big and heavy as a cow. In (25), a fox is considered attractive in appearance so its physical image is mapped onto a woman who is attractive.

As to the behavior of the animals, the peculiar behavior of the animal in question is resorted to so that the behavior of the person being mapped onto stands out vividly and is gotten across more effectively. The following example (26)-(30) demonstrate the phenomenon.

(26) What an old goat. (an obstinate person) (Ahrens, 1999)
(27) Don’t be such an ostrich. (one who avoids facing facts) (Ahrens, 1999)
(28) Watch out when you are dealing with John. He is a snake in the grass. (a deceitful and sinister person)
(29) I am just a rabbit in tennis. (someone who plays a game badly)
(30) She is a dragon. (one who is fierce and unpleasant, a fairly informal use)

A goat is considered obstinate because it will butt the fence post until it loosens. With this image of the goat, anyone who is obstinate is referred to as a goat. An ostrich is thought to avoid facing facts because it always buries its head in the sand when confronted with an enemy. In western society, a dragon appears in the stories and legends, having wings and claws and breathing out fire. A very awful woman is naturally mapped onto the image of a dragon. From the above animal metaphors in English, we can see that each animal is characterized by its typical or unique behavior or temperament, which is also a metonymic use of CATEGORY FOR DEFINING FEATURE. Then the overall animal is mapped onto human with the same feature. No unduly ascription or connotation is involved.

One thing must be pointed out is that different cultural experience or knowledge can bring about different animal metaphor mappings. For example, a cow, a common helper in Chinese agricultural society, is considered a typical example of obstinate animals by Chinese people. The reason is that when it gets angry, it refuses to get moving even if people try very hard pulling them. In Chinese, an obstinate person will be mapped onto a cow. For Chinese people, a dragon is regarded as coming from the heaven so it is mapped onto a very noble, important and influential man rather than an unpleasant woman.

Three other idiomatic expressions in English are given in (31), (32), (33) and (34) for further understanding.

(31) Beat the dog before the lion. (chastise or humiliate a mean person in the presence of a great one)
(32) A wolf in sheep’s clothing. (hypocrite, kind in appearance but mean inside)
(33) A little bird told me. (one who is well-informed)
(34) I got it straight from the horse's mouth. (someone who is in a position to know that it is true)

From all these animal metaphors in English, we find that humans are understood as animals based strictly on their similarity in appearance or in behavior. The body parts of the animal are not used to stand for the entire animal. Not all animals are collectively and indiscriminately used to stand for the features "brutality or lack of reasoning" as in Chinese. Animal metaphors are done justice to duly and they deserve what they deserve in English.

4 General discussion and conclusion

In Chinese, there is an idiom "yi guan qinshou" (literally meaning a beast in clothing), which refers to a person who is a gentleman in appearance and a beast in conduct. The same idiom is also found in English: A wolf in sheep's clothing. In China, the second saint of China, Mencius (372?-289? B.C.), once said that "if people are well fed, warmly clad, and comfortably lodged, without being taught at the same time, they become almost like the beasts." In English, a beast or a brute is used as a cover term for someone who behaves aggressively or ruthlessly. In Chinese, we have a similar expression "qingshou bu ru" (worse than a beast). From the above statements, we know that animals are considered brutal and aggressive and they certainly have no thinking, reflective and reasoning ability as humans do and this is a universal fact. Similar expressions may be found in every language in the world. But in Chinese, the concept that "Humans are superior to animals" is reflected even stronger in the language use. When a person is mapped onto an animal, whatever animal it is, in many cases, a negative connotation is directed at the person. In Chinese mind, "the brutality and the lack of reasoning ability" are potentially inherent in the animals they mention. We may say that the Chinese have a bias toward animals in language use and sometimes do not do justice to them because many individual animals are mapped onto bad images with no justification, as is evidenced from example (9, 10, 12).

In section 2 and section 3, we examine the animal metaphors in Chinese and in English. We demonstrate that the deep-rooted Chinese cultural concept that "human are superior to animals" is reflected linguistically in the use of animal metaphors and we compare them with those of English to see how they are different.

We find that, as a metonymic language like Chinese, it is no wonder that many expressions make use of metonymies. There is no exception to animal metaphors in Chinese. In addition to following the Invariance Hypothesis, the metonymic relationship between the source domain and the target domain must be identified. With the identification of the metonymic relation, cultural concept underlying the use of the language must also be taken into account so that the connotation of the animal metaphors can be rightly construed.

In animal metaphors in Chinese, body parts of the animals are often used to stand for the whole animals whereas in English, the overall animals are used. Just the mere mention of the animal parts rings bad image in Chinese. We argue that it is because that the animals in Chinese potentially stand for "brutality, no good and lack of reasoning". We can schematize our discussion in the following figure, which means that the body part of an animal can stand for an individual animal, which in turn stands for animals as a whole. The animals potentially stand for "brutality, no good and lack of reasoning", which is a cultural concept of Chinese people. With figure 4 in the following, we can explain the negative connotation of many animal metaphors in Chinese.

\[
\text{stand for} \quad \text{stand for}
\]

Body part......> individual animal......>

Animal......> "brutality, no good, lack of reasoning"

Figure 4

If a person's look is like an animal, he, in Chinese cultural concept, must be mean or bad one way or another. In contrast, in English humans are mapped onto animals based on their similarity to animals in either appearance or in behavior. When a person is mapped onto the cover term like beasts or brutes which refer to mainly fierce animals in English, he is degraded. If he is called with an individual animal name like a dog or a cat, he is not necessarily thought to be brutal or lack reasoning ability. But the reverse is true in Chinese. With this argument, we attribute this phenomenon to the cultural concept that strongly underlies the use of animal metaphors in Chinese: "humans are superior to animals."

From the above discussion, we realize that the cultural concept of a people will sway the people's use of the language. Therefore, in processing another language we cannot but pay attention to the cultural concept underlying language use. In this way, we can have access to the connotation of some language expressions more effectively. This fact equally applies to the application of artificial intelligence. For the computers to process human language, cultural concept must be incorporated in the programs so that more effective and more exact simulations can be brought about.

Acknowledgements

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9 The exact birth date of Mencius is not known.
my friend Laura Liu for her encouragement during the writing process.

References
Systematic Parallels in Metaphorical Expressions in Japanese and German

Christoph Neumann
Tokyo Institute of Technology
Oookayama 2-12-1, Meguro-ku
Tokyo 152-8552, Japan
neumann@cs.titech.ac.jp

Abstract

100 parallel metaphorical expressions in German and Japanese are presented in three categories according to their organisation. The existence of parallels between distant languages implies that the human mind organises concepts in a holistic way. Ontologies in natural language processing must be rethought in the light of these findings as a cognitive-based semantic interlingua.

1 Introduction

Metaphorisation is a frequent means in any language to extend and alter meanings of existing words and create new meanings based on the existing lexicon. In this work, we present parallel metaphors in Japanese and German to show that this linguistic mechanism is not a coincidental feature of linguistic creativity, but a inherent way of semantic reference.

We have analysed and classified about 100 concrete metaphorical expressions that are parallel in German and Japanese, two distant languages that are affiliated to different language families and that have had no language contact until 100 years ago, thus a completely independent etymological history. Thus, if a similar metaphor occurs in both languages, this parallel has probably to be assigned to coincidence or to universal human cognitive properties.

By presenting various types of metaphors, we try, indeed, to suggest that there is a universal meaning structure and reference to the world in the human mind which probably differs from conventional concepts in semantics, and that metaphorical mechanisms give a clue how this structure could be derived.

2 Parallel metaphorical expressions

We have built a corpus of 97 metaphorical expressions that are parallel in German and Japanese. Although appearing heterogeneous on the surface, all metaphorical expressions have the same fundamental features: They are constructed in two levels; two or more linguistic elements (lexemes or meanings of lexemes) are connected and form the metaphorical element (one lexeme with different meanings or a complex expression). The metaphorical elements in Japanese and German are considered parallel if their semantic organisation is (partially) isomorphic on both hierarchy levels; i.e. the elements themselves are equivalent and at least one of the constituent elements is equivalent.

In metaphorical studies, data are normally classified according to formal criteria like word class or syntactical distribution or to semantic criteria like [+/-animate] (cf. Metzler 1993). We tried to establish, however, a scheme of classification which takes account of the different mechanisms how the different meanings of expressions are related to each other.

We distinguish three groups of organisation on the top level according to the hierarchy of form and meaning: Polysomic lexemes (different meanings are united within one
form [dictionary equivalence], complex expressions (different words [forms] are united within an idiomatic expression [one meaning]) and compound words (different words [forms] are united within a new word [form]).

All three classes with their subclasses are listed in the following paragraphs with a characterisation of the class or subclass, the number of occurrences of that parallel metaphor type and a graphic representation of the parallel character. Several detailed examples for all subclasses can be found in the appendix.

2.1 Polysemic Lexemes

1. German and Japanese word with same literal meaning also have same figurative meaning (38 occurrences)

2. German and Japanese word have both two or more distinct meanings and are isomorphic in all meanings (4 occurrences).

Figure 2: Structure of polysemic lexemes with same two meanings

Figure 3: Structure of "Body-mind" words

3. "body-mind" words: Parts or functions of the human body designate in both languages in the same time the same state of mind or emotion (5 occurrences).

Figure 4: Structure of metaphors with explicit comparison

2.2 Complex Expressions

1. Explicit metaphors: Both languages use the same fixed metaphor with a comparative preposition to specify a degree (mostly adjectives) (3 occurrences).

2. Idiomatic expressions in German and Japanese with same meaning use keywords that also have same meaning (17 occurrences)
2.3 Compound words

In a compound word having the same meaning in German and Japanese, one or more composing constituents also have the same meaning (17 occurrences).

Figure 8: Structure of compound words with same constituent words

3 Significance of results

From the viewpoint of one single language, metaphors are likely to seem dispensable: not "compulsory exercise" for daily use of language, but rather "free skating", a toy of brilliant rhetoricians or writers.

However, in the next chapter, we will conclude from our observations that metaphorisation is indeed a fundamental part of language production and that this understanding should have several implications for research in NLP. To be able to draw conclusions, we must first single out the significance of the results.

3.1 Lean metaphors

Although German and Japanese are both languages with a large number of speakers and a long literary tradition, they have been in mutual language contact only since Japan's opening to the West 130 years ago. Other than e.g. neighbouring French and German, similarities may not be attributed to mutual language exchange and influence.

It has been supposed, though, that parallel expressions in Japanese are mere translations of their German counterparts that entered Japanese through literary works and the general admiration for the German culture in Japan since the late 19th century.
There are indeed, such "lean metaphors", like the compound word *hinketsu* ("anaemia"), which is a literal translation of German *Blutarmut* (blood-poverty).

However, most entries in our corpus are not scientific terms, but describe fundamental daily-use objects or human relations. It is no coincidence that we found a lot of emotional metaphors. It may be assumed that most of these metaphors were already in use before German and Japanese came into language contact.

A stronger argument is that in most idiomatic expressions and compound words, only one of the constituent elements is parallel in both languages, while all other constituents are completely different. If the Japanese expression had been derived from a German blueprint, all parts of the German expression would have probably been translated into Japanese.

### 3.2 Possible metaphors

Another counter argument against over-estimating the results may be that 100 parallel expressions are a tiny quantity compared to all non-parallel metaphors.

A study of the actual relation parallel vs. non-parallel metaphorical expressions is of course desirable but not feasible in this study.

However, we consider more significant than actually existing metaphors "possible" metaphors, i.e. metaphors that exist only in one language, but are instantly understood by speakers of the other language when translated word by word.

In this context, it is not surprising that also English speakers don’t have difficulties to understand most entries in our corpus only from the literal translation even without the explanation. In fact, in several cases it was difficult for us to find paraphrases of the different meanings in English that were NOT themselves used metaphorically parallel.

### 4 Metaphorisation as an insight into cognitive ontologies

#### 4.1 Organisation of cognition

Parallel metaphors in distant languages like Japanese and German suggest fervently that metaphorisation is a fundamental part of language production.

The results have two implications on the theory of the organisation of the human mind:

**4.1.1. Weighting of concepts**

Traditional semantics considers the organisation of concepts in human mind to be a "lexical field" where related words are close, while unrelated words are not connected.

The closeness of the relation is often measured in the intersection of common "compositional sents", leading to a metonomy hierarchy. In semantic theory.

However, there are differences in the importance of several concept sents. The results suggest that body and body experiences are central to the human way of perceiving the world.

**4.1.2. Holistic structuring:**

However, we believe that there are rather "whole", fundamental concepts and ideas. All aspects of the outside world are described with this limited set of concepts, regardless of the "material" constitution of that part of the world.

The set of concepts that are reused everywhere probably consists of fundamental human experiences, of which the above mentioned importance of body and mind, probably also spatial elements.

### 5 New ontologies in NLP

There are two types of conventional ontologies in NLP: One is based on the idea in compositional semantics (cf. EDR 1988), the other on the syntagmatic relations with
other sentence elements as first suggested in Generative Semantics (cf. Schank 1973).

However, we need a holistic independent representation of meaning to account for the parallels in metaphors.

E.g. The two meanings of parallel German Berg and Japanese yama ("mountain" and "large amount") are classified in the EDR ontology (EDR 1988) in very distant categories 12151 (Land masses) und 20557 (Gradeability).

We need an abstract interlingua to describe concepts in semantic parallel to the interlingua for syntactical relations.

This is also an indication that the cognitive, "inconscious" logic intrinsic to language is not equal to the "conscious" logic with which we try describe language (cf. also modality, cf. Neumann 1999).

6 Outlook

This work is not supposed to be a coherent survey of parallel metaphorical expressions in German and Japanese. It was rather supposed to draw the attention to the surprising number of parallels in two etymologically different languages and to establish a system of classification as a foundation for further, extensive studies of the phenomenon.

Future points of interests are:

- Ratio comparison: The main point of interest is how many parallel expressions two distant languages have and how many metaphorical expressions are not parallel. The ratio of these two numbers must be compared to the ratio of two close languages. The comparison of the two ratios would lend itself to three distinct conclusions: If the absolute numbers are low, metaphorical use has to be assigned more or less to mere coincidence. If the ratio in close languages is much higher than that of distant languages, metaphorical use is probably mainly due to language contact.

If, however, both ratios are high and on a similar level, we would have a strong indication for the above mentioned fundamental character of metaphorisation.

- Practical implementation: Research should start checking for all metaphorical expressions (preferably starting with one field like idiomatic expressions) in Japanese or German the equivalents in the other language.

- Comprehensability: Metaphorical uses in one language that are not parallel should be presented to speakers of the other language, asking them to guess the meaning of the expression. If the ratio of the guessing is high, this would indicate that the semantic organisation of the human mind is in fact universal, while the lexicalisation of that semantic organisation (through metaphors) would be a marked coincidence in a single language.
Appendix: Corpus of parallel metaphorical expressions in German and Japanese (excerpts)

Table 1: Polysemic lexemes with same literal and figurative meaning

<table>
<thead>
<tr>
<th>German word</th>
<th>Japanese word</th>
<th>Part-of-speech</th>
<th>Literal meaning</th>
<th>Figurative meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jungfrau</td>
<td>shojo</td>
<td>NOUN</td>
<td>no sexual experience</td>
<td>not used</td>
</tr>
<tr>
<td>Ramen</td>
<td>waku</td>
<td>NOUN</td>
<td>(picture) frame</td>
<td>limit</td>
</tr>
<tr>
<td>reifen</td>
<td>yaburi</td>
<td>VERB</td>
<td>tear apart</td>
<td>end</td>
</tr>
<tr>
<td>fett</td>
<td>shikkari</td>
<td>ADJECTIVE</td>
<td>not loose</td>
<td>facetful</td>
</tr>
<tr>
<td>schlaffen</td>
<td>mucha</td>
<td>ADJECTIVE</td>
<td>(mentally)mad</td>
<td>very</td>
</tr>
</tbody>
</table>

Table 2: Polysemic lexemes with same two meanings

<table>
<thead>
<tr>
<th>German word</th>
<th>Japanese word</th>
<th>Part-of-speech</th>
<th>Meaning 1</th>
<th>Meaning 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>sich-beschützen</td>
<td>ochitsuku</td>
<td>NOUN</td>
<td>calm down (emotion)</td>
<td>calm down (wind; volcano)</td>
</tr>
<tr>
<td>während</td>
<td>nagara</td>
<td>CONJUNCTION</td>
<td>temporally parallel</td>
<td>adversative</td>
</tr>
<tr>
<td>rand</td>
<td>marui</td>
<td>ADJECTIVE</td>
<td>round (geometrical)</td>
<td>experienced (character)</td>
</tr>
</tbody>
</table>

Table 3: "Body-mind" words

<table>
<thead>
<tr>
<th>German word</th>
<th>Japanese word</th>
<th>Part-of-speech</th>
<th>&quot;Body&quot; meaning</th>
<th>&quot;Emotional&quot; meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haltung</td>
<td>shisei</td>
<td>NOUN</td>
<td>posture</td>
<td>attitude</td>
</tr>
<tr>
<td>verletzen</td>
<td>kizutsuku</td>
<td>VERB</td>
<td>wound</td>
<td>result</td>
</tr>
<tr>
<td>im Griff haben</td>
<td>osaeru</td>
<td>VERB</td>
<td>hold tight</td>
<td>control</td>
</tr>
</tbody>
</table>

Table 4: Metaphors with explicit comparison

<table>
<thead>
<tr>
<th>German phrase</th>
<th>Japanese phrase</th>
<th>Meaning of phrase</th>
<th>Meaning of comparison word [bold]</th>
<th>Figurative meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>(freudig) wie die Riesen</td>
<td>mitsubachi-no-you (ni kinben)</td>
<td>very (diligent)</td>
<td>bee</td>
<td>not used</td>
</tr>
<tr>
<td>mein</td>
<td>akumu-no-you</td>
<td>horrible</td>
<td>nightmare</td>
<td>limit</td>
</tr>
<tr>
<td>Abrechnung</td>
<td>moujutsu-turu</td>
<td>obey</td>
<td>blind</td>
<td>end</td>
</tr>
</tbody>
</table>
Table 5: Idiomatic expressions with same keyword

<table>
<thead>
<tr>
<th>German phrase</th>
<th>Japanese phrase</th>
<th>Figurative meaning</th>
<th>Meaning of comparison word [bold]</th>
</tr>
</thead>
<tbody>
<tr>
<td>sich nicht mal machen</td>
<td>te-wo murasa-nai</td>
<td>avoid to help somebody</td>
<td>not wet</td>
</tr>
<tr>
<td>NEFL get wet make</td>
<td>hand-OBJ make_wet-not</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sich in ein Wasser stürzen</td>
<td>kiyomizu-no-butai kara</td>
<td>commence a venture</td>
<td>plunge</td>
</tr>
<tr>
<td>REFL m a venture plunge</td>
<td>temple_Kiyomizu-of-platform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>grün hinter den Osten</td>
<td>oshiri-ga ao</td>
<td>have to experience</td>
<td>green</td>
</tr>
<tr>
<td>green behind the ear</td>
<td>backside-NOM green</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Idiomatic expressions with same two keywords

<table>
<thead>
<tr>
<th>German phrase</th>
<th>Japanese phrase</th>
<th>Figurative meaning</th>
<th>Meaning of comparison word 1 [bold]</th>
<th>Meaning of comparison word 2 [underlined]</th>
</tr>
</thead>
<tbody>
<tr>
<td>auf den Tisch hauen</td>
<td>trukue-wo tataka</td>
<td>protest fervently</td>
<td>table</td>
<td>hit</td>
</tr>
<tr>
<td>on the table hit</td>
<td>table-OBJ hit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>zusammen schlafen</td>
<td>lshoni accu</td>
<td>base sex</td>
<td>together</td>
<td>sleep</td>
</tr>
<tr>
<td>together sleep</td>
<td>together sleep</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>das ist nicht dein Bier</td>
<td>anata-no saka</td>
<td>this is none of</td>
<td>beer [German] -</td>
<td>your</td>
</tr>
<tr>
<td>this is not your beer</td>
<td>junai</td>
<td>your concern</td>
<td>noodles [Japanese]</td>
<td></td>
</tr>
<tr>
<td>is_not</td>
<td>noodles</td>
<td></td>
<td>(both part of daily nutrition)</td>
<td></td>
</tr>
</tbody>
</table>

Table 7: Idiomatic expressions with same "body" keyword

<table>
<thead>
<tr>
<th>German phrase</th>
<th>Japanese phrase</th>
<th>Figurative meaning</th>
<th>Meaning of body word [bold]</th>
</tr>
</thead>
<tbody>
<tr>
<td>das juckt mich nicht</td>
<td>itaku-no kayuku-no nai</td>
<td>I don't care</td>
<td>(not itch)</td>
</tr>
<tr>
<td>that itches me not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ich habe 1000 Hände</td>
<td>Te-ga mawaranai</td>
<td>I have no time to</td>
<td>hand</td>
</tr>
<tr>
<td>I have no 1000 hands</td>
<td>hand-OBJ not_turn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eine Wut im Bauch haben</td>
<td>kara-ga tatsu</td>
<td>be angry</td>
<td>belly</td>
</tr>
<tr>
<td>a rage in the belly have</td>
<td>belly-SUBJ stand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 8: Compound word with same constituent words

<table>
<thead>
<tr>
<th>German compound word</th>
<th>Japanese compound word</th>
<th>Part-of-speech</th>
<th>Meaning of compound</th>
<th>Meaning of constituent word 1 [bold]</th>
<th>Meaning of constituent word 2 [underlined], if applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wörterbuch</td>
<td>sakigake</td>
<td>NOUN</td>
<td>pioneer</td>
<td>Font</td>
<td>ride (horse)</td>
</tr>
<tr>
<td>bodenkunde</td>
<td>jimi</td>
<td>NOUN</td>
<td>indigenous</td>
<td>soil</td>
<td></td>
</tr>
<tr>
<td>Breunung</td>
<td>shouden</td>
<td>NOUN</td>
<td>focus</td>
<td>born</td>
<td>point</td>
</tr>
<tr>
<td>Embildung</td>
<td>souzou</td>
<td>NOUN</td>
<td>imagination</td>
<td>image</td>
<td></td>
</tr>
<tr>
<td>leichtenhing</td>
<td>karubazumi</td>
<td>ADJECTIVE</td>
<td>cariless</td>
<td>light (weight)</td>
<td></td>
</tr>
</tbody>
</table>

### References


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136
To 'Run' a Marriage:
Conceptualization of Marriage in Current Chinese

Laura Hsiu-min Liu; Lily I-wen Su
Graduate Institute of Linguistics, National Taiwan University
1, Sect. 4 Roosevelt Rd. Taipei, Taiwan 106
R4142001@ms.cc.ntu.edu.tw; IwenSu@ccms.ntu.edu.tw

Abstract

The objective of this paper is to investigate the conceptual metaphors of MARRIAGE as BUSINESS in current Chinese. Based on the balanced corpus provided by CKIP of Academia Sinica in the present study, we have found that some of the familiar metaphors with which Chinese conceptualize marriage are quite similar to English metaphors about marriage; however, there exist some subtle differences on their mapping relations of image schemas. The linguistic expressions which reflect cognitive metaphors of MARRIAGE in Chinese include: MARRIAGE IS AN ONGOING JOURNEY, MARRIAGE IS A BUSINESS, MARRIAGE IS A GAMBLE, and MARRIAGE IS A BOUNDAGE. The conceptualization of MARRIAGE as BUSINESS outnumbers other types of conceptual metaphors about marriage at 59.3%. A new concept of "running/managing" a marriage has emerged in current Chinese. The motivation to conceptualize MARRIAGE as BUSINESS in Chinese is a long testimony to the change of cultural values.

1 Introduction

Metaphors is one of the powerful cognitive tools for our conceptualization of abstract categories. Lakoff and Turner (1989) argue that the poetic language is not essentially different from ordinary language in that it makes use of the same basic conceptual metaphors we employ in our daily thinking and reasoning. The difference between the poetic language and ordinary language lies in the way these conceptual metaphors get extended, elaborated, questioned, or composed. Lakoff (1990) further proposed the Invariance Hypothesis to characterize the regularities in both our conceptual and linguistic systems. The Invariance Hypothesis claims that the portion of the source domain that is mapped preserves cognitive typology. And since the source domains of some metaphorical concepts such as the understanding of time, states, events, actions, etc. are structured by image-schemas, it is suggested that reasoning involving these concepts is fundamentally image-based.

With the conviction that human conceptual system is fundamentally metaphorical in nature, researchers on metaphors have proposed a number of conceptual metaphors that are basic to human understanding, thinking, and reasoning (Lakoff and Johnson 1980). Among them are metaphors such as Life is a journey, Time moves, More is up, which structure our conceptualizations about life, time, and quantity. Many of these studies, however, draw their conclusions only from English data. Whether these are the same metaphors that conceptualize many of the linguistic expressions in Chinese have remained unknown. We believe, as Lakoff (1980; 1990) claims, that metaphors are grounded in our physical or social/cultural experiences. The metaphorical structure of the most fundamental concepts in a culture will be therefore coherent with the most fundamental values of that culture. Since some physical experiences are common to all humans and some other experiences differ from culture to culture, we may reasonably hypothesize that some of these metaphors are universal while others are culturally specific.

The objective of this paper is to investigate the conceptual metaphors of MARRIAGE as BUSINESS in current Chinese. We will address the following questions: What are the linguistic expressions which reflect cognitive metaphors of MARRIAGE in Chinese? How do some of the major structural analogies facilitate the mapping from the source model BUSINESS onto the target model MARRIAGE? What factors may motivate Chinese people conceptualize MARRIAGE as BUSINESS? The organization of the paper is as followed: Section 2 describe the data and methodology for the study. Section presents the findings based on the data under analysis. Section 4 discusses the implication of the study and finally, a summary will be given in Section 5.
2 Data and Methodology

All the data used for the present study comes from four sources. Written data comprise articles in the newspapers and the balanced corpus of provided by CKIP of Academia Sinica (Chinese Knowledge Information Processing Group), a 3.5 million word Chinese balance corpus with part-of-speech tagged and open to public. Spoken data are collected in the following types: face-to-face conversation, lecture in public, and radio interviews. We also rely on examples produced by native speakers of the Chinese language and we consult both Chinese and English dictionaries for additional information.

In analyzing the conceptualization of hunyin 'marriage', the first step is to identify its core meanings used in the context. Then we work with the distinction between metaphorical use and non-metaphorical use of hunyin 'marriage' in our database and made codes for different conceptual metaphors of marriage. We further note the image-schemas via which the source domain builds up mapping from BUSINESS domain onto MARRIAGE domain.

3 Findings

3.1 Core Senses of 'Marriage'

By definition of the dictionary, hunyin 'marriage' refers to 'legal union of a man and woman as husband and wife' or 'state of being married'. It consists of two parties (relationship) uniting legally (contract) and makes individuals into a new unit: family (product). When hunyin is used, many senses are involved. It may refer to 1) the marital status, 2) institution, 3) contract/promise, 4) relationship between husband and wife, 5) the spouse and 6) the decision to get married (with whom or when).

(1) ta pa nu da nan xiao de. she fear female older male younger DE hunyin bu hui bai-tou-xie-lao marriage Neg MOD last: forever 'She fears that marrying a younger husband cannot keep the marriage last long.' Sense of hunyin 'marriage' ➔ 'marital status'

(2) jinxuan canyi yuan ke shi Clinton run senator can make Clinton fu fu de hunyin gen gonggu husband and wife DE marriage more stronger Sense of hunyin 'marriage' ➔ 'marital relationship'

(3) bu you xiang tai duo, Neg Mod think too much anxin shou zai hunyinzhong 'Don't worry too much, just keep your marital promise/contract.' Sense of hunyin 'marriage' ➔ 'promise/contract'

(4) dangchu ta xuan zhe xiang hunyin then she choose this CL marriage nanfang you xuduo difang shi ta xinshang de. husband exist many place SHI she like DE 'When she chose him as her husband, he has many characteristics that attract her.' Sense of hunyin 'marriage' ➔ 'spouse'

(5) gannian ta tichang hunyin appreciate he propose marital institution 'to appreciate that he made a proposal of legal marital institution.' Sense of hunyin 'marriage' ➔ 'marital institution'

(6) liang ren ganqin hen wending two person love very stable buguo lunji hunjia hai zao. But talk marriage still early 'They love each other, but it's still too early to get married now.' Sense of hunyin 'marriage' ➔ 'decision to get married'

(7) nimen zhongguotai hao le, you China too good Par hunyin quan you yu mu zaozhu marriage all by parents control 'It's so good that in China parents decide which person they should marry and when.' Sense of hunyin 'marriage' ➔ 'decision to get married with whom and when'.

3.2 Conceptual Metaphors of MARRIAGE

According to Quinn (1987), five main and three additional schemas for propositions about marriage have been identified in the American cultural model of marriage, as shown in the following:

MARRIAGE IS ENDURING
MARRIAGE IS MUTUALLY BENEFICIAL
MARRIAGE IS UNKNOWN AT THE OUTSET
MARRIAGE IS DIFFICULT
MARRIAGE IS EFFORTFUL
MARRIAGE IS JOINT
MARRIAGE MAY SUCCEED OR FAIL
MARRIAGE IS RISKY

Quinn (1987) also provides some metaphors for the underlying schemas of marriage. Metaphors of enduringness about marriage, for example, include MARRIAGE IS A MANUFACTURED PRODUCT, MARRIAGE IS AN ONGOING JOURNEY, and MARRIAGE IS A DURABLE BOND BETWEEN TWO PEOPLE; metaphors for marital benefit include A SPOUSE IS A FITTING PART and MARRIAGE IS AN INVESTMENT.

Based on the data collected and analyzed in the present study, we have found that some of the familiar metaphors with which Chinese conceptualize marriage are quite similar to English metaphors about marriage; however, there exist some subtle differences on their mapping relations of image schemas. The linguistic expressions which reflect cognitive metaphors of
MARRIAGE in Chinese include: MARRIAGE IS AN ONGOING JOURNEY, MARRIAGE IS A BUSINESS, MARRIAGE IS A GAMBLE, and MARRIAGE IS A BOUNDAGE.

3.2.1 Marriage as an Ongoing Journey
Both Chinese and English conceptualize marriage as an ongoing journey, but different image-schemas mapped are involved in the two cultures. English metaphors about marriage, as Quinn (1987) suggests, focus on the enduring facet, while Chinese on the decision to get married (the road taken) and the subsequent circumstances one has to face. Consider the following examples (8)–(10):

(8) zou shang hunyin zhe tiao lu walk ASP marriage this CL road 'to take the road of marriage'

(9) hunyin liang qi le hongdeng marriage light DC ASP red:light 'to see a red light in a marriage'

(10) zai hunyin zhong zhan bu zuo jiao Prep marriage inside stand Negfirm foot 'cannot stand firm in a marriage'

A person considers to get married or not as if he is encountering with a crossroad: To go this way or that way, that is the question. Sometimes he or she goes smoothly and sometimes has to 'stop' before a red light. There might be unexpected obstacles on the road to make the person in a marriage stumble.

3.2.2 Marriage as a Business
Marriage is conceptualized as a business and it can be managed. The husband and wife are considered as partners working for their enterprise, i.e., family/matrimonial benefit. The management may be good or bad, so may the marriage succeed or fail, such as hunyin chengguang/shibai 'to succeed/fail in a marriage'. The outcome of their efforts is thought as a manufactured product, the quality of which reflects the couple's marital status. Devoting or committing oneself to a marriage usually means to spend time and money for the spouse or family. This investment makes the enterprise of marriage survive and develop.

(11) hunyin shi keyi jingying de marriage COP can manage NOM 'A marriage can be managed.'

(12) hunyin pinzi marriage quality 'the quality of marriage'

(13) tuzi zai hunyin zong invest prep marriage inside 'to invest in a marriage'.

Interestingly, there is a unique metaphor about marriage in current Chinese: SINGLE PEOPLE ARE SELLING GOODS. Single persons are priced for sale in the 'market of marriage'. Since marriage of younger husband and older wife is not preferred in Chinese culture, older single women are often carry-over. Thus single men are always advantaged at marriage, as shown in example (14) from our corpus.

(14) Nanren zai hunyin shichang shang men prep marriage market in bi nuren zhangyouushi COMP women advantaged 'Single' Men have a better market value than women at marriage'.

3.2.3 Marriage as a Gamble
Sometimes marriage is a matter of chance like gambling; one cannot tell he will win or lose until he or she takes a gamble on marriage. It is considered risky but still worth a try, as in example (15):

(15) hunyin shi yi zhong duzhu, marriage COP one CL gamble you su you ying. exist lose exist win 'A marriage is a gamble; you may lose or win'

3.2.4 Marriage as a Bondage
Marriage can be a sweat bond for wanderers who hope to 'settle down' but a bondage for free souls. One may feel confined physically or mentally as a result of too much responsibility coming along in a marriage or too close relationship between husbands and wives.

(16) bei hunyin de jiaxue lao zhu BEI marriage DE bondage tie tight 'be kept in bondage of marriage'

Among a total of 176 tokens of the word hunyin 'marriage' collected from our corpus, 84.6% (149 instances) are used as one of its core meanings, and 15.4% (27 instances) are conceptualized in a metaphorical way, as shown in Table 1.

<table>
<thead>
<tr>
<th>Metaphors of Marriage</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marriage as an ongoing journey</td>
<td>9</td>
<td>33.3</td>
</tr>
<tr>
<td>Marriage as a business</td>
<td>16</td>
<td>59.3</td>
</tr>
<tr>
<td>Marriage as a gamble</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td>Marriage as a bondage</td>
<td>2</td>
<td>3.7</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
</tr>
</tbody>
</table>

The conceptualization of MARRIAGE as BUSINESS outnumbers other type of conceptual metaphors about marriage at 59.3%. In the following section we will further elaborate on the image schemas employed in metaphorical mapping from source domain BUSINESS onto the target domain MARRIAGE.

3.3 Conceptualization of MARRIAGE as BUSINESS in Chinese
In general, the functions of business contain planning, organizing, directing and controlling. It is involved with various kinds of economic activities to make money, including staffing, managing, manufacturing, controlling production and quality, marketing,
accounting, financing, and so on. In the conceptual metaphor of 'A marriage is a business', the semantic feature of 'relationship' is most prominent in invoking conceptual mappings between source and target domains. The two parties in a marriage may compete like enemies in business, or cooperate as partners for their joint benefit. How they build up a commercial/marital relationship determines the quality of their manufactured product/marital status.

Not all of the features or functions of BUSINESS are mapped onto MARRIAGE and neither are all of the core senses of *hunyin* 'marriage' in Chinese metaphorically developed as the target domain. The conceptual metaphor MARRIAGE IS AN INVESTMENT is mapped via the image-schema that MARRIAGE NEEDS TO BE INVESTED. However, unlike English, this metaphor in Chinese does not imply that MARRIAGE IS "MUTUALLY" BENEFICIAL, as Quinn (1987) illustrates with English examples. Since the position of wives/women is beneath that of husbands/men in Chinese culture, the benefit cannot be shared equally even if a woman does 'invest' more than her husband in marital relationship. (17) is an instance of the metaphor MARRIAGE IS AN INVESTMENT in which the source domain 'a blue chip' (stock) is image-schematically mapped onto the target domain 'a good husband'(spouse).

(17) yi ge nuren jiran jiangle le jiyouku, one CL woman since marry Asbluechip
dasuan changqi touzi, guocheng zhong
tend long-term invest process between
namnian zaoshou likou ceshi
more:or:less face difficulties test
'Once a woman marry well (a blue chip) and
wants to make a long-term investment, she may
encounter with many difficulties in the marital
life'.

In second metaphor under conceptualization of marriage as business, the marital relationship is mapped as the manufactured product so that can be measured according to quality. The image schema involved is MARRIAGE IS EFFORTFUL and (18) below is an example:

(18) fu qi ji hunyin pinzhi
husband wife and marriage quality
'love for one's spouse and marital quality'

In (19), the marital relationship is conceptualized as the result of two people's management via the image schema that MARRIAGE MAY SUCCEED OR FAIL.

(19) hunyin shibai yi shi dui peio de
marriage fail too COP prep spouse DE
yaoqiu tai gao
requirement too high
'The failure of marriage was resulted from too
much expectation of one's spouse.'

The fourth metaphor to conceptualize MARRIAGE as BUSINESS builds up the mapping from the source SELLING GOODS to the target SINGLE PEOPLE via the image-schema that SINGLE PEOPLE ARE AVAILABLE/SELLING.

(20) Wonghong buzzali bi tan
Wonghong no:longer avoid
ri nanyou dan pan neixiao.
Japan ex-boyfriend but hope import
'Wong-hone is now open to talk about her
Japanese boyfriend but still want to marry a
Chinese guy.'

What features or portions of the source BUSINESS are more prominent to conceptualize MARRIAGE? The frequency distribution of the conceptual metaphors of MARRIAGE as BUSINESS is as followed in Table 2:

<table>
<thead>
<tr>
<th>Conceptualization of Marriage as Business</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing</td>
<td>11</td>
<td>68.8</td>
</tr>
<tr>
<td>Investing</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>Marketing</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100</td>
</tr>
</tbody>
</table>

According to the findings in Table 2, MARRIAGE is usually conceptualized as BUSINESS with respect to the 'managing' facet (68.8%), followed by 'investing' (12.5%) and 'marketing' (12.5%) and then 'manufacturing' (6.5%). Figure 1 shows the mapping relations between MARRIAGE and BUSINESS:

![Figure 1 Mapping relations between source domain BUSINESS and target domain MARRIAGE](image)
4 Discussion

4.1 Invariance Hypothesis

The marital relationship is the most prominent sense that is been provoked as the mapping target. In the source domain, it is the relationship, i.e., the partnership in BUSINESS that mostly serves as the mapping source, via the image-schemas of managing. In the metaphor MARRIAGE IS A MANUFACTURED PRODUCT, the quality of the product is mapped onto the target ‘marital status’. Spouse is conceptualized as stocks via the image-schema of investing; single people are mapped as selling goods via the image schema of marketing.

These findings in the present study support Lakoff (1990)'s Invariance Hypothesis that the portion of the source domain mapped preserves cognitive typology. Under the BUSINESS source domain, the marital relationship becomes ‘more equal’ as partnership, the marriage (life) is the result of mutual efforts leading to quality of the manufactured product, the spouse as stocks and the single as goods for sale.

4.2 Metaphors of Marriage in Corpus

Based on the findings of Table 1, the non-metaphorical use of hunyin 'marriage' (84.6%) far outnumbers its metaphorical use (15.4%). It is plausible that in everyday life we do not always use language in a metaphorical way. Sometimes we just mention the term hunyin 'marriage' by referring to one of its basic meanings and it is those core senses that serve as a common ground for metaphorical mapping.

While searching the metaphors of marriage for data analysis, we have found the CKIP Balanced Corpus a powerful tool to collect some instances in a minute. The frequency tokens provide us a quantitative base to understand a general use of hunyin 'marriage'. However, information from native speakers are also needed since sometimes the types gathered from corpus are far from exhaustion. A few metaphors cannot be reached by the key-word search but can be recognized from the co-occurring linguistic expressions in appropriate contexts.

4.3 Marriage as Business: Then and Now

In earlier folklore studies of proverbs about MARRIAGE, people are found to make marriages ‘by arrangement’ according to their parents or matchmakers. The freedom of marriage was not esteemed at that time. Many people even saw their husbands or wives the first time on the day of marriage. They thought yinyuan tian zhuding 'Marriages are pre-destined' and divorces were not acceptable to the society. Thus, to Chinese people, getting married is considered as a significant and even fatal decision in life, especially for women. There is an old saying that Nan pa xuan co hang, nu pa jia co lang ‘Men's disaster is to choose a wrong career/job; women's misery is to marry a wrong husband.' It explains well that marriage means much different to men and women.

However, with the influence of Western cultures through mass media, this traditional value has been challenged and adjusted. A new concept of "running/managing" a marriage has emerged in current Chinese, though conceptualization of marriage as business in Chinese is not a brand new idea since marriage in ancient Chinese was a trade for national peace or personal wealth. People now have different perspectives of MARRIAGE and of the partnership in a marital relation, which is conceptualized via metaphor in ordinary language. The motivation to conceptualize MARRIAGE as BUSINESS in Chinese is a long testimony to the change of cultural values.

5 Conclusions

In this paper, we have identified four conceptual metaphors of marriage in Chinese: MARRIAGE IS AN ONGOING JOURNEY, MARRIAGE IS A BUSINESS, MARRIAGE IS A GAMBLE, and MARRIAGE IS A BOUNDAGE. Based on the data under analysis, 84.6% (149 instances) of the words hunyin 'marriage' collected from our corpus are used as one of its core meanings, and 15.4% (27 instances) are conceptualized in a metaphorical way, among which the conceptualization of MARRIAGE as BUSINESS outnumbers other type of conceptual metaphors about marriage at 59.3%. MARRIAGE is usually conceptualized as BUSINESS with respect to the 'managing' facet (58.8%), followed by 'investing' (12.5%) and 'marketing' (12.5%) and then 'manufacturing' (6.5%).

The findings in the present study support Lakoff (1990)'s Invariance Hypothesis that the portion of the source domain mapped preserves cognitive typology. Under the BUSINESS source domain, the marital relationship becomes 'more equal' as partnership, the marriage (life) is the result of mutual efforts leading to quality of the manufactured product, the spouse as stocks and the single as goods for sale.

We have also shown the motivation to conceptualize MARRIAGE as BUSINESS in Chinese is a long testimony to the change of cultural values. Marriage in ancient Chinese was a trade for national peace or personal wealth, but with the influence of Western cultures through mass media, a new concept of "running/managing" a marriage has emerged in current Chinese.
References


**METAPHOR: IS IT THE SAME FOR CHILDREN AND ADULTS?**

by Ann Dowker, Department of Experimental Psychology, University of Oxford, South Parks Road, Oxford OX1 3UD

I will here discuss children’s and adults’ use of metaphors (here including similes). When researchers attempt to distinguish between literal and figurative (including metaphorical) language, the distinction is often difficult to make. Fass (1997) points out (p.2) that “it has proved extremely hard to develop precise criteria for distinguishing literal from nonliteral language”. He mentions two traditional criteria: truth conditions (nonliteral language contains a falsehood) and language constraints (literal language conforms to constraints on “normal” language use, whereas nonliteral language violates these constraints). When such criteria are stated thus clearly, their limitations become noticeable. Literal language can contain falsehood. A child who stated that 42 - 26 = 24, or the weatherman who stated in October 1987 that there would not be a hurricane, were making incorrect and therefore false statements, but they would not normally be regarded as nonliteral. Even when false statements are deliberate lies rather than mistakes (“I didn’t break the vase”), these are intended to induce false beliefs about the literal, rather than to be taken nonliterally. As regards violation of language constraints, some metaphors do so in a very obvious way (“Sermons are sleeping tablets”), but some scarcely at all (“I see your point”).

There are many theories of how metaphor production and interpretation take place in adult; the following are just a few examples (Tourangeau and Sternberg, 1982; Fass, 1997):

1. *the anomaly view*. According to this view, metaphors are defined by the dissimilarities between source and target, and presume a two-stage interpretation process, where literal interpretation is first attempted, is prevented by anomaly, whereupon a metaphoric interpretation is then attempted.

2. *the comparison view*, where a metaphor is said to contain a partial nonliteral resemblance between a source term and a target term. Whereas the anomaly view emphasizes dissimilarities, the comparison view emphasizes similarities.

3. *the interaction view*. The source is a means of perceiving the target in a new way, thereby forcing reorganization of the target. Similarities are created, rather than pre-existing.

4. *the contextual appropriateness view*. Such a statement as "Men are not cattle" can have a literal or metaphorical meaning, depending on the context. Such a view is consistent with the extensive cross-cultural differences in metaphor use; e.g. "Carol is a fox" would mean "Carol
is sly" if used by an British speaker, but "Carol is an attractive woman" if used by a Canadian speaker.

The distinctions made between these and other definitions of metaphor can perhaps be most fittingly criticized through reference to an extended metaphorical poem: John G. Saxe’s tale of the six blind men who each felt different parts of the elephant and then “disputed loud and long” as to whether the elephant was like a wall, rope, fan, etc. It seems likely that metaphor interpretation and production, like so many cognitive processes (Campbell et al, 1996; Dowker, 1998) do not involve a single unitary process, but are made up of many components: the perception of anomaly, the perception of similarity, the invention of similarities, the understanding and use of context, etc.

Gibbs (1994) put forward the view that, in both children and adults, the distinction between figurative and literal language is less sharp than has sometimes been assumed. He stated (p. 435-6) that “similar cognitive mechanisms drive our understanding of both literal and figurative speech”; that “people need not recognize figurative language as violating communicative norms and maxims in order to understand what those expressions figuratively mean”; and that “a great deal of our thinking is constituted by metaphorical mappings from dissimilar source and target domains”. Examples of the latter include thinking of understanding as seeing (“That’s very clear”; “I’ve got the picture”, etc.) or anger as heated fluid in a container (“He got all steamed up”; “I was boiling over”; “She hit the ceiling”).

There have been numerous studies of the development and early use of metaphor, with a particular explosion of interest in the late 1970s and early 1980s. Most of these studies suggest that some forms of metaphor begin very early (e.g. Gardner, Winner, Bechina, and Wolf, 1978; Billow, 1981; Winner, 1982, 1988; Fourment, Emmenecker and Pantz, 1987; Gentner, Falkenheimer and Skorstad, 1988; Pearson, 1990; Broderick, 1991; Caramelli and Montanari, 1995) suggest that some forms of metaphor begin very early. Billow (1981) found that it occurred frequently in the spontaneous play and conversation of children from two and a half to six; and that it did not increase in frequency with age with in that age range.

Gardner et al (1978) and Winner (1982, 1988) also report extensive use of metaphor during the preschool period; though unlike Billow they found significant age differences. Metaphor increased during the preschool period and then declined with the onset of a ‘literal stage’ at the age of about 6 or 7. It was suggested that during this period, children become more aware of linguistic rules and category boundaries and are reluctant to violate them. By adolescence, these rules and boundaries are more firmly defined, and the children are in complete control of them, and thus may be more ready to violate them for particular purposes. This may parallel the U-shaped relationships between expertise and strategy variability that Dowker, Flood, Griffiths, Harriss and Hook (1996) have
proposed for other domains such as mathematics.

For example, in an early study, Gardner, Kircher, Winner and Perkins (1975) asked children ranging in age from 4 to 19 production tasks involving the free completion of similes, and also forced-choice preference tasks where they had to choose from a set of four similes the one most appropriate to a given literary context. The set of similes included one literal simile, one conventional metaphoric simile, one novel and appropriate metaphoric simile, and one inappropriate simile. The preschoolers showed no consistent systematic bias in their preferences, while older children progressed with age from literal to conventional to appropriate similes. Where production was concerned, the preschoolers gave a higher percentage both of inappropriate and of novel appropriate metaphors than did those in any other age group. Gardner et al (1975) suggested that young children have a heightened capacity for appreciating novel relations, but at the same time lack the critical judgement and analytic ability that would enable them to reject the irrelevant.

Later studies have mostly supported the view that young children are capable of comprehending and using metaphors; though there are some age differences in their frequency and predominant types. Numerous studies (Gardner et al, 1978; Dowker, 1986; Gentner, 1988; Seitz, 1997) young children tend to use perceptual metaphors (“When we walk around [at night] we look like shadows”; “The tape recorder [switched on too loudly] sounds like a giant - well, a baby giant”) whereas older children and adults use a relatively larger number of cross-sensory metaphors (“Her dress is so loud that it shouts”), psychological/physical metaphors (“Shall I compare thee to a summer’s day?”; “Depression descended on me like a dark fog”) and other relational metaphors, involving non-perceptual analogies (“My brain is like a computer”; “A cloud is like a sponge).

There are also differences between the contexts in which children and adults use metaphor. Adults may use metaphor in numerous contexts, but it is pre-eminently a poetic device, and is extensively used in written and oral poetry across a wide variety of cultures (Finnegan, 1977). Dowker, Krasowicz, Pinto, Roazzi and Smith (1998) found, however, that there are strong cross-cultural differences in the extent to which 4-to 6-year-old children use metaphor in their rhythmical poems. French and Brazilian children use metaphors with some frequency, but they are very rarely used in the poems of English, Italian or Polish children. This does not mean that young children in these groups cannot use metaphor; most of the evidence in favour of the early use of metaphor comes from studies of English-speaking children, and indeed some of the English participants in Dowker et al’s (1998) study used metaphor in spontaneous speech where they did not use it in their poems. But they do not appear to regard a rhythmical poem as a special context favouring its use.

So far, the assumption has been that ‘metaphors’ do mean the same when used by children and by adults; despite possible differences in the frequency of metaphor as a whole, and in the relative frequency of different types of metaphor.
Not everyone, however, agrees that all the ‘metaphors’ used by children really are metaphors. Hakes (1982) states that early figurative utterances “arise not out of control of the figurative but out of failure to differentiate between the literal and the figurative”. Aimard (1977) also considers that most metaphors by children are involuntary. He notes that anthropomorphism and other genre confusions may lead to false ‘metaphors’ by children and also perhaps by some adults.

One objection to the labelling of preschoolers’ spontaneous nonliteral utterances as ‘metaphors’ is that as Snyder (1980) pointed out, many of them were renamings that occurred in symbolic play. Snyder doubts whether symbolic play renamings should count as metaphor, since, in the process of renaming, the object or literal meaning is totally engulfed by the new symbolic domain. It could be added that, while symbolic play renamings may be based on perceptual or functional similarities between objects, they may simply be due to children’s desire to represent a particular object and their willingness to use any object in the environment for the purpose, which may have no more metaphorical implications that the pretence that an object is present when nothing is there at all.

A more general argument against excessive readiness to label young children’s utterances as metaphors is that some ‘metaphors’ are over-extensions of meaning due to a lack of precise knowledge of word meanings, similar to the behaviour of an 18-month-old child who has just learned the word “doggie” and applies it to all four-legged animals. Most researchers from Gardner et al (1978) onwards have attempted to guard against this possibility by only including renamings as “metaphors” if the children showed evidence of knowledge of the correct name for the renamed object, and of correct use of the term used in renaming.

Attempts to distinguish metaphor from overextension rest on the assumption that at least some overextension is due to a genuine belief that the term applies to the objects to which it is extended (or, at least, to the lack of a clear understanding that it is not). But some, such as Frengen and Fay (1980), argue that overextensions in production are not due to overextensions in comprehension. Young children have a limited vocabulary. Despite realizing that a certain word is inappropriate to a certain referent, whose name (s)he does not know, a child may use the word because it is the most appropriate term that (s)he has available. Nelson et al (1978) argue that overextensions based on perceptual similarities are really statements of analogy. The 18-month-old child, who is not yet capable of making a statement such as “This grapefruit looks like the moon” or even “This thing - I don’t know it’s name - looks like the moon” may point to a grapefruit and say, “Moon”. Such utterances, according to Nelson et al, are a part of the child’s emerging fascination with similarities and differences, which plays an important part in the early formation of categories.

If a child uses an inappropriate term, not because of overextension in comprehension, but as an imperfect substitute for the more appropriate term that
Earlier, I proposed that anomaly recognition, similarity recognition, similarity invention and understanding and use of context should not be seen as alternative theories of metaphor, but as complementary components. It is likely that age differences are greater for anomaly recognition and use of context than for similarity recognition or similarity invention (see also Broderick, 1991). Age variations in the different components may also be qualitatively different. Age variations in similarity recognition and invention may be principally due to limited domain knowledge restricting the types of similarities used by young children to predominantly perceptual ones; whereas age variations in recognition of anomaly may lead to the U-shaped pattern of metaphoric development with age, proposed by Gardner et al (1978) and Winner (1988), whereby increasing awareness of anomaly first restricts the frequency and variability of both appropriate and inappropriate metaphors, and later permits an increase in appropriate metaphors.

In any case, metaphors are an important feature of both children’s and adults’ thinking. They reflect and may develop the ability to use analogies in thought and problem-solving; and, as pointed out by Dias and Harris (1990) with regard to pretend play, enable them to consider alternative worlds to the ‘real’ one. They are also enjoyable. In conclusion, here is a metaphorical poem by a 4-year-old English-speaking child in Dowker et al’s (1998) study:

"It was as quiet as the night.  
The rabbits were running across the street faster than the wind.  
They were hopping around so fast.  
We saw them run so fast  
That the badgers watched us.  
The trees were as big as a girl  
And they could fall down  
Into the woods of a chipmunk."
References


Some Assembly Required:

A Position Paper Concerning

The Shared Basis of Metaphor, Analogy and Concept Combination

Tony Veale, Jer Hayes

School of Computer Applications, Dublin City University, Dublin, Ireland.

Email: tonyv@compapp.dcu.ie

1. Introduction

Concept combination is a core process in the generation and interpretation of noun:noun and adjective:noun compounds. Since such compounds may be read literally or metaphorically, the combination process must be capable of both literal and metaphoric interpretations. Similarly, because the logic of a concept – the body of constraints that dictate how it is used and given meaning in the world – is codified in the concept’s representational structure, the combination process must respect this structure if the meaning of the compound is to logically follow from the meaning of its parts. In this position paper we argue for a unified, algorithmic approach to concept combination that employs a single mechanism, structure-mapping, to interpret both literal and metaphoric compounds. Because the rationale of structure-mapping is the consistent alignment of conceptual representations on both semantic and structural grounds, this unified approach also accounts for much of the complex inferences arising from the combination process.

The approach is cognitively parsimonious, not only because it employs a single mechanism for two broad types of combination, but because it shares this key mechanism, structure-mapping, with the cognitive faculties of metaphor and analogy. The approach is also computationally tractable, as it is grounded in a specific algorithmic model of metaphor, called Sapper (see Veale and Keane, 1997, 1998), that has previously been proven tractable. These specific claims linking combination to metaphor also make the theory falsifiable in a scientific sense.

Our current work exploits parallels of this nature between concept combination and analogical reasoning to propose a unified, structure-mapping approach to concept combination, one that brings the same mechanisms to bear on both literal and metaphoric compounds. This unification is proposed not only for reasons of cognitive parsimony, but as a satisfactory means of resolving a vexing philosophical problem concerning the significant grey area that connects literal and metaphoric uses of compounding. Because many compounds cannot be classified with certainty as being wholly literal or metaphoric, it makes no sense to propose distinct mechanisms for each type, since we would not be able to formulate an adequate set of switching criteria to decide which mechanism to invoke. For example, while the compound “nuclear war” seems conventionally literal, and “cola war” seems clearly metaphoric, how should one categorize “gang war”, a compound that can arguably go either way (inasmuch as it seems to stretch the formal notion of War, while satisfying all the physical
requirements of one)? Since such thorny examples undermine the idea of a deterministic basis for separating metaphor from non-metaphor, we propose instead that this distinction is actually a post-interpretative one that arises naturally out of a unified structural interpretation.

For example, a "web pornographer" can be seen as a literal extension of the category Pornographer, denoting a person who plies his trade on the internet. In contrast, the compound "web mason", denoting a person who constructs virtual-reality buildings on the web using a language such as VRML, is most likely a metaphorical compound, since most people would consider VRML bricks to belong to a radically different category than StoneBrick. In each case it is the amount of structural modification wrought by the structure-mapping mechanism that determines whether the resultant structure belongs to a significantly different category than the original target, and is thus ostensibly metaphorical (see Glucksberg and Keysar (1990) and McGlone (1996) for a theory that grounds metaphor in category extension). This category judgement is left to the cognitive agent, not to the combination mechanism, and thus might be tempered by a multitude of contextual influences outside the scope of the mechanism.

2. Structure-Mapping in Concept Combination

Isomorphic structure-mapping is a mathematical notion that guarantees the systematicity and coherence of any resulting correspondences, by ensuring that each relevant relation and object of the target domain receives at most one correspondence with the source (or modifier) domain. In an isomorphic structure-mapping then, elements of one domain are aligned with elements from another not only on the basis of shared properties (e.g., in the compound "aerial dogfight", MadDog and FighterPlane share the property Dangerous), but primarily on the basis of common relational structure. That is, two elements are considered well aligned if they occupy equivalent positions in the same relational structures.

In the example "math clinic", one can perversely map Teacher to Patient and Student to Doctor because each mapping aligns a Person with a Person. However, these mappings are less preferable than Teacher : Doctor and Student : Patient because Teacher relates to Student in many of the same ways that Doctor relates to Patient. In general, structural alignments that map on the basis of relations (and the more connected, the better) are preferable to those that simply map on the basis of properties. We should be careful to note that while relational structure-mapping underlies the most established models of analogical reasoning, it is also clearly present in literal examples that do not have the overt feel of analogy. For instance, the combinations "police academy" and "military school" each involve structure-mapping (the former between School and Army, the latter between Police-Force and Academy) to produce blended concepts that literally contain their stated components (see Fauconnier and Turner, 1998). Evidence for systematic structure-mapping can be seen in the way hierarchies of rank from one domain (Police and Army) map consistently onto rank social hierarchies in another (School). So, in a military school, we expect the teachers to possess higher ranks than the students if they are to enforce discipline. This expectation arises from a structure-mapping of relations in the domain of Army to relations in the domain of School (e.g., the relation DrillSergeant—control→Private can align with Teacher—control→Student).

The conceptual representation of an object may contain a complex of interacting actions and events, and causes and effects, and conceptual modifiers may specify alternate fillers from some of these actions. A theory of combination must therefore posit a means to pinpoint that part of the target structure that is modified. For example, the combination "paper cut" does not direct us to transfer key properties of Paper to Cut (what is a "paperish cut"?"), rather it directs
us to find that role in the concept of Cutting that Paper can sensibly fill. The meaning of “paper cut” is thus a cut inflicted by a sheet of paper, where this sharp-edged sheet fulfils the same role as a blade (the exemplar cause of a cut). If properties are transferred, they are transferred between Paper and Blade, rather than Paper and Cut, fixing a “paper cut” as a cut inflicted by a blade-like sheet of paper. This process of structural accommodation has, in our view, much in common then with that of analogical reasoning. Similarities must be found between the modifier and some analogous part of the target to motivate the replacement of the latter with the former, in a way that ensures the meaningfulness of the combination.

For instance, the combination of concepts with complex structures may require interpretations that consistently connect multiple elements of each. Since the modifier in a combination is frequently used to shift the target concept into a new domain of discourse (e.g., consider “star wars”, “street wars”, “cola wars”), the support structure of the target – those concepts relative to which it has meaning – may have to be shifted into the new domain also. For example, though the concept Pornographer might be described in terms of self-contained features such as Seedy, Disreputable and Immoral, it is ultimately defined in terms of other support concepts representing the results of pornography. This necessary conceptual baggage will thus form a part of any combination. So in the combination “web pornographer”, one must find a counterpart not only for the concept Pornographer in the domain of Web, but also for the concepts Pornography, Pornographic-Image, Pornographic-Text, and so on, if the combination is to make sense. For instance, one can interpret the compound as “a Content-Provider whose web-site contains Pornographic GIF and AVI files”. This is essentially a form of structure-mapping, whereby several elements of the target structure are coherently mapped or aligned with corresponding elements of the modifier structure.

This form of structure mapping is perhaps most in evidence in metaphorical and analogical compounding, since many computational theories of metaphor are founded on the very idea of structure-mapping (see Falkenhainer, Gentner and Skorstad, 1987; Veale et al. 1997, 1998). The related notion of systematality, which refers to the consistent treatment of conceptual structure both within and across metaphors, is also central to contemporary theories of metaphor (e.g., see Lakoff and Johnson, 1980) and analogy (see Gentner, 1983; Falkenhainer et al., 1989). The extent to which structure-mapping is required by concept combination varies from one compound to another. Some analogical compounds, such as “aerial dogfight”, require the replacement of a single element of the target structure (i.e., MadDog becomes FighterPlane, as both are aggressive, dangerous, and prone to Attack and Retreat behaviour), while many others require whole systems of target elements to be replaced consistently. For instance, the compound “math clinic”, which compares a remedial mathematics class with a medical clinic, requires a consistent mapping (and subsequent replacement) of Doctor to Teacher and Patient to Student. One might elaborate the basic mapping even further, and view Ignorance as a Disease and Knowledge as a Cure, but even at its simplest, multiple elements do have to be replaced. Since a “math clinic” is more than a hospital in which mathematics is thought (e.g., we do not imagine a ward of bed-ridden students), the full mechanics of structure-mapping have to be brought to bear on such compounds.

Even when a combination appears to make a single substitution of the MadDog: FighterPlane variety, there may exist a network of unseen or tacit substitutions that give weight to the particular interpretation and support the underlying logic of the compound. These tacit mappings may only become apparent when one elaborates the underlying metaphor or analogy at length. For instance, consider the rap-music compound “government cheese”, which denotes
the concept SocialWelfareHandout. The basic mapping between Cheese and Handout may be based on a nutrition metaphor (i.e., handouts enable people to eat), but it is the larger mapping context – in which the recipient is cast in the role of a submissive pet, and the government is viewed as a dominant pet-owner – that gives this particular metaphor any credibility.

The structure of a concept serves to organize the concept's properties, roles and prototypical fillers relative to each other, imposing both a spatio-temporal and aesthetic ordering on its contents. This is necessary since a concept is more than a bag of flat properties. Social concepts, such as Eating or Dating, can involve complex script-like structures that outline prototypical expectations about the actions and events that cohere over time to define a social situation. So when such concepts are combined with others, it is important that the internal structure of the concept is respected, otherwise features may be projected onto incorrect aspects of the target. This may mean, in turn, that coherent spatio-temporal inferences cannot be made about the result of the combination. However, by using structural alignment as a guide to the combination of structured concepts, this internal organization of concepts will be respected, and meaningful inferences may be drawn automatically.

3.1. Time and Structure
Consider the rather odious combination "date rape". A Date is a complex social ritual which, prototypically, can be summarized as follows: a man gives a woman flowers and candy, and takes her to a restaurant for dinner; a movie might ensue, and afterwards there may be some minor sexual contact in the guise of hand-holding and kissing (for convenience this is a very traditionalist view). A Rape is a criminal act in which a rapist (almost always a man) forces the victim (typically a woman) to have non-consensual sex. Now, a "date rape" is much more than a rape crime in which the rapist gives his victim flowers and candy, as both concepts structurally interlock in very specific fashion. Typically, the rapist uses the opportunity of minor sexual contact at the end of the night to force full sexual intercourse on the victim. Thus, from the spatio-temporal organization of the combining concepts, we can infer the spatio-temporal structure of the resulting combination.

This interpretation requires a coherent alignment of conceptual structures, with the structure of Rape fitting into that part of Date involving sexual contact. Importantly, the alignment generates a set of role correspondences that allow us to fully integrate the modifier and target concepts. Since, prototypically, it is the man that initiates sexual contact at the end of a date, it is the man that aligns with the rapist, while it is the woman that aligns with the victim. Without this alignment, one cannot truly claim to have understood the combination. Arising from this alignment is perhaps the most diagnostic inference one can make about a "date rape", namely, that the victim had prior social contact with the rapist.

3.2. Logic and Structure
This example demonstrates that the logic of a concept lies in the structural relationship between its constituent ideas. By respecting this structure during a combination, structure-mapping consequently executes this logic, producing coherent inferences that demonstrate that the combination has truly been understood. This is particularly true of combinations that radically shift the target concept away from its prototypical norms, for it is then that
misapprehensions of logic become most apparent. For instance, the combination “prison rape” is yet another unsavoury example of logic operating through structure. Here the modifier does more that indicate a change of event location; the associated support structure of the Prison concept may not have roles of the appropriate gender, leading the mapping mechanism to produce an interpretation that maps both Rapist and Victim to instances of MalePrisoner (e.g., BullyPrisoner and WeakPrisoner).

3.3. Process and Structure
This notion of logical structure is of particular importance in the understanding of process-oriented concepts, that is, concepts who meaning centers upon how it causes other concepts to be modified and changed. To take a simple example, consider the compound “cream whisk”. To a person familiar with the idea of a Whisk — a hand-held device for beating eggs — this compound can be understood as a structural insertion in which Cream replaces Egg in our understanding of Whisk. The similarity between eggs and cream (e.g., both are runny, sticky, tasty sources of protein) allows Cream to be substituted for Egg in the analogical mapping that results. However, to understand why “honey whisk” makes little or no sense requires a knowledge of the process involved in whisking, and the transformations that occur. Beaten eggs, like whisked cream, turn from runny liquids into fluffy, aerated semi-solids, so we expect an “X whisk” to induce a similar change of state in X. Though one is tempted to consider this line of reasoning an ad-hoc post-combination inference, we argue that it naturally arises out of the combination process itself. In mapping Cream (or concept X) to Egg, overt semantic similarity may be supported by deeper, structural similarity. A knowledge of the causal chains EGG—become—OMELETTE—depend—WHISK and CREAM—become—WHIPPEDCREAM—depend—WHISK allows the additional similarity between WhippedCream and Omelette to influence our appreciation of the compound. This structural support would not be provided by Honey, Cheese, Water or any number of superficially similar concepts which do not obey analogous process transformations.

3.4. Function and Structure
A structure-mapping between conceptual structures can reveal the representational joints connecting two concepts. An understanding of the shared sub-structure of two concepts is thus an invaluable guide to blending those concepts, since any fusing of structures will likely occur around this common interface. Consider, for instance, the context compound “time bomb”, which might be understood as a blend of the concepts AlarmClock and Bomb (where Time evokes the larger context AlarmClock via the relation ALARMclock—control—TIME). Though a subjective interpretation on our part, this analysis does respect the process logic of the combination as discussed earlier. Alarm clocks, like bombs, “go off” noisily at a pre-determined time, which is ticked down by an internal clock mechanism. A “time bomb” is thus understood as an explosive clock which delivers more than a wake-up call.

Similarly, the compound “car bomb” can be understood as an identity which directs the hearer to create a blend of the concepts Car and Bomb (essentially a car that has been rigged to act as a bomb). By considering the structural alignment of Car and Bomb, one can recognize inherent similarities of function between the ignition of the car’s engine by the sparkplugs, and the detonation of a bomb by its detonator. But whereas the ignition of a car’s engine leads to the combustion of fuel, the detonation of a bomb leads to the explosion of incendiary materials. This analogy—grounded in the similarities between Combustion and Explosion, and
between Gasoline and Nitroglycerine—is rich enough to suggest that in the blended concept, the car's ignition serves as the car-bomb's detonator. Thus, a car bomb is interpreted as a car which explodes when the driver attempts to start his engine.

4. Advantages of the Structural Perspective

We consider the structure-mapping position to offer a significant number of advantages over other approaches to concept combination. We conclude this position paper then with a brief summary of these theoretical benefits:

1. A structural account of concept combination is *diachronic*. It shows how new combinations arise by using existing contexts as a structural ground. For instance, the combinations "coffee bar" and "coffee house" might be understood in terms of the concept PublicHouse, which is essentially a bar that sells beer and alcohol. A "coffee house" is thus a premises that sells coffee instead of alcoholic beverages (consider also "salad bar", "sandwich bar" and "heel bar" as more modern coinages). Likewise, a "software house" might (indeed, most likely is) understood in terms of the pre-existing compound "publishing house", since Software is a modern form of published media.

2. The account is *experiential*. It shows how one can understand novel structures in terms of those that have already been acquired and understood (e.g., "coffee house" in terms of "public house"). For instance, the combination "snow leopard" might be understood in terms of the concept PolarBear, a vicious predator associated with the arctic circle and snowy climes. A snow leopard can thus be understood as a predator that inhabits snowy terrain. Likewise, for those who have ever seen inside a hospital, the combination "male nurse" means more than simply a man working as a nurse. Male nurses are typically employed to deal with psychiatric patients who may do harm to themselves and/or others, and thus, are burly security guard and nurse blended into one.

3. Whole complexes of structure are mapped between modifier and target concepts. Thus, someone who is "criminally insane" is not only criminal and insane, but one whose acts of insanity are crimes in themselves (e.g., as opposed to a logical criminal mastermind with a neurotic but harmless hand-washing obsession). Similarly, the structural view sees a "religious terrorist" not simply as a terrorist who believes in God, but as a terrorist whose acts of terror are motivated by deep religious belief.

4. The retrieved context provides a *grounding from which emergent properties* can arise. For instance, the structure-mapping between Tavern and Garden that is cued by the compound "beer garden" allows one to visualize a bar in which customers sit outdoors on white plastic (or wooden) garden furniture. Likewise, a "museum leopard" will most likely be pictured as a stuffed exhibit in a natural history museum. A system can thus conclude not only that a "museum leopard" is a *dead* leopard, but that it has a variety of properties not usually associated with dead animals: it will stand upright, with open eyes and a healthy (looking) coat. This follows from our knowledge of natural history museums, which are not in the habit of showcasing their exhibits on their backs, with their legs in the air.

155
5. Grounding in known conceptual structures provides validation, or a plausibility check, for an interpretation of a concept combination. For instance, by deferring to the context PolarBear, one can rationalize the white coat of a "snow leopard" in terms of camouflage, as this relationship be already represented in the structure for PolarBear. Likewise, the combination "winged lion" can be interpreted in terms of Pegasus, or WingedHorse. One can thus visualize the wings in proper proportion to the lion body (i.e., they won't simply be sparrow-sized wings grafted onto a large feline body), and in the proper location (around the midriff, near the centre of gravity). So one has no need to resort to theories of aerodynamics to construct and validate the interpretation, since the prior existence of such a chimera will provide sufficient plausibility.

6. Figurative and literal uses of concept combination can be explained by the same account. We know that metaphoric concept combinations such as "unix guru", "tiger economy" and "sawdust Caesar" involve structural alignment to a large extent, so it seems reasonable (if only because of a belief in cognitive parsimony) that literal combinations should also. 

This view is reinforced by the existence of numerous grey area examples in which it is unclear whether concepts are being used literally or metaphorically. For instance, does "light sabre" denote a metaphorical or literal extension of the concept Sabre? A sword that employs a laser-beam rather than a steel blade certainly is quiet removed from our typical representation of the idea, but the combination does indeed serve the role of a sabre. Is a "hose gun" (or "water cannon") a kind of gun that spits water instead of bullets? Ultimately, if the meaning of a word is to be found in the way the word is used, the meaning of an object must likewise derive from its use. This suggests that if grey area cases cannot be usefully segregated into literal and figurative camps, a uniform mechanism should be used to understand them all.

7. Vague concepts, such as those underlying weak lexical modifiers, can be understood in terms of exemplars of their use. Weak modifiers are those, like "pleasent" and "fake", that cannot readily be defined in terms of some internal conceptual model, but by reference to the contexts in which it is felicitous to use them (a "pleasant meal" may differ, conceptually and inferentially, from a "pleasant afternoon"). For instance, Fake is typically taken to denote a concept that is intended to be perceived as a particular concept X, but which is not actually an X (e.g., a fake gun is not a gun; a fake Picasso is not a Picasso; etc.). However, numerous examples abound to refute this general definition (e.g., "fake tears" are real tears, since only the supporting emotions are false; "fake breasts" are still breasts, albeit with unnatural silicone additives, and so on). By viewing the modifier as a retrieval cue for a larger context, rather than an alignable structure in itself, appropriate exemplars can be retrieved to suit the combination at hand (for instance, any one of Michael Jackson's marriages might be retrieved as a context for "fake marriage", that is, a marriage that is real under the law, but not under a social and emotional interpretation).

8. A model that can handle vague modifiers like "fake" can also handle structure-rich modifiers as well. Thus, the model can account for both adjective:noun and noun:noun combinations (of either literal or figurative varieties).
5. References


