

# **Corpus-based approaches to metaphor and metonymy**

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## **1. Introduction**

It is probably fair to say that over the past fifteen years, corpus-based methods have established themselves as the major empirical paradigm in linguistics. They have been insightfully applied to research issues pertaining to all levels of linguistic structure (although there is a certain dominance of studies dealing with lexis and grammar) and to many aspects of language use.

The field of metaphor and metonymy research, which has received a huge impetus by the emergence of the theory of conceptual mappings (Lakoff and Johnson 1980, cf. also Lakoff 1987, Johnson 1987, Lakoff and Turner 1989, Lakoff 1993), is lagging slightly behind with respect to this trend, but recently, a number of researchers have begun to remedy this situation by laying the methodological foundations for a strong emphasis on authentic data and the empirical verification of many of the fascinating theoretical claims in the field. In the following, I will attempt to give a brief overview over this work (including, but not limited to the papers in this volume), focusing on methodological problems and possible solutions as well as the most important results of corpus-based research into metaphor and metonymy to date.

## **2. Extracting metaphors and metonymies from corpora**

The first problem that any corpus-based analysis faces is that of identifying and extracting the relevant data from the corpus. This is a simple task in investigations of lexical items or fixed expressions (which can be retrieved directly), and a somewhat more complex though still reasonably straightforward task in investigations of many grammatical phenomena (which can be retrieved by making use of the part-of-speech tagging or the grammatical annotation available in at least some relatively large corpora or by automatic or semi-automatic on-the-fly parsing). However, in the case of metaphor and metonymy, retrieving the relevant data is, at

first glance, almost impossible for the simple reason that conceptual mappings are not linked to particular linguistic forms. There are various conceivable types of semantic annotation that could help solve this problem, but none of the currently available large corpora contain any semantic annotation (and this true even more so of corpora assembled by researchers in the context of specific research questions). Thus, the vast majority of corpus-based research on conceptual mappings cannot rely on annotated corpora. Consequently, a number of strategies for extracting linguistic expressions manifesting conceptual mappings from non-annotated corpora have been proposed, in particular, the following three (*searching* is here used as a cover term for traditional concordancing and automatic or semi-automatic annotation/extraction):

- (i) *Manual searching.* Early text-based studies of metaphor rely on a procedure where the researcher carefully reads through the corpus extracting all metaphors he or she comes across (see Semino and Masci 1996, Jäkel 1995, 1997 for examples of this approach, and esp. Jäkel 1997: 145ff. for a justification of this method as compared to genuinely corpus-based methods). The manual extraction of metaphors has a number of problems, not the least of which is that it drastically limits the potential size of the corpus. In addition, it shares a number of additional problems with the manual annotation of metaphors, discussed in detail in Section 4 below.
- (ii) *Searching for source domain vocabulary.* Metaphorical and metonymic expressions always contain lexical items from their source domain (this is what makes them non-literal in the first place). Thus, it is a reasonable strategy to begin an investigation by selecting a potential source domain (i.e., a semantic domain or field that is known to play a role in metaphorical or metonymic expressions. In a first step, the researcher can then search for individual lexical items from this domain (cf. Deignan 1999a, b, this volume, Hanks 2004, this volume, Hilpert, this volume) or whole sets of such items (cf. Partington 1997, 2003, this volume, Koller, this volume, Markert and Nissim 2002b, this volume). The choice of items can be based on *a priori* decisions (cf. Deignan, this volume, Koller, this volume, Hilpert, this volume), it can be based on existing exhaustive lists (cf. Markert and Nissim, this volume), or it can be based on a preceding keyword analysis of texts dealing with target-domain topics (cf. the six-step procedure presented by Partington, this volume, based on Partington 1997, 2003). The search for these items can then be exhaustive (i.e., all oc-

currences of the item(s) in question are retrieved, cf. Deignan, this volume, Hilpert, this volume, Koller, this volume), or it can be limited to particular contexts that are considered to be promising (cf. Hanks, 2004, this volume) or relevant to the research question (Stefanowitsch 2005). In a second step, the researcher then identifies the target domains in which these items occur, and thus, the metaphorical or metonymic mappings in which they participate. How and on the basis of what criteria this identification proceeds is, of course, a non-trivial matter (cf. Section 4 below).

- (iii) *Searching for target domain vocabulary.* Often, research on conceptual mappings is concerned with particular target domains and the conceptual mappings that structure it. In these cases, the source-domain oriented approach described in the preceding section cannot be fruitfully applied, since it requires *a priori* knowledge of the source domains that are likely to be found in the target domain. While Partington's *keywords*-based method goes some way towards solving this issue, it comes with two caveats. First, it requires the existence of large bodies of representative and relatively monothematic texts dealing with the target domain; thus, it can be fruitfully applied in the case of target domains like ECONOMICS, SPORTS, or POLITICS, but it is less clear how it could be applied with target domains like EMOTIONS, MENTAL ACTIVITY, PERCEPTION, etc.). Second, it will identify only those source domains that are associated with particular words whose frequencies are sufficiently inflated in the target-domain texts to achieve keyword status; thus, it will not identify metaphorical expressions exhaustively or systematically. A number of researchers have suggested an alternative strategy for investigating target domains (Koivisto-Alanko 2000, Tissari 2003, Stefanowitsch, 2004, this volume, Koivisto-Alanko and Tissari, this volume). They begin by selecting and searching for lexical items referring directly to target-domain concepts. In a second step, the researcher then identifies those cases where these words are embedded in metaphorical expressions and thus, the metaphorical mappings occurring in the target domain (it is not clear whether this method can be applied to the investigation of metonymy). Clearly, this method will only identify a subset of metaphorical expressions, namely those that contain target-domain vocabulary. For example, it will identify *His pent-up anger welled up inside him*, but not *We got a rise out of him* (both from Lakoff 1987: 384). There is initial evidence, however, that this subset of expressions, referred to by Stefanowitsch (2004, this volume) as *metaphor-*

*ical patterns*, is representative; it seems to identify all mappings posited in the literature as well as additional ones (Stefanowitsch, this volume).

- (iv) *Searching for sentences containing lexical items from both the source domain and the target domain.* The two methods described above can be combined, i.e., the researcher can search for sentences (or other parsing units deemed suitable) containing both source and target domain vocabulary; this is especially useful for automatic annotation/extraction (Martin, this volume). This method requires exhaustive lists of source and target domain vocabulary as well as corpora that are annotated for clause and/or sentence boundaries (alternatively, they must be preprocessed accordingly). Given these preconditions, the annotation and extraction itself is a relatively easy task. Like the other two methods, this one is not perfect. First, manual post-editing is required to get rid of false hits due to, for example, homographs or the literal use of both source and target domain vocabulary in a single sentence (note, however, that this post-editing presumably takes less time than the completely manual annotation required by the previously discussed strategies). Recall will also not be perfect, since it is probably impossible to list source and target domain vocabulary exhaustively, and thus specific lexical items will be missing on the lists; however, a human annotator in the methods described above will almost certainly also miss examples, so this is not really a disadvantage specific to this method. Third, this method can only be used straightforwardly to identify expressions manifesting conceptual mappings that are known in advance (although more exploratory extensions are imaginable, given word lists for many different potential source and target domains). Finally, this method, like the one discussed in (ii) above, will only capture those metaphorical expressions that Stefanowitsch (2004, this volume) refers to as *metaphorical patterns*. However, these disadvantages are counterbalanced by the fact that the method allows fast annotation of vast amounts of text, far beyond what a human annotator could achieve in a reasonable time frame. Thus, it is surprising that it has not, so far, been used more widely.
- (v) *Searching for metaphors based on 'markers of metaphor'.* An intriguing possibility for the automatic retrieval of metaphors is indicated by Goatly (1997, Ch. 6). Goatly discusses a wide variety of explicit linguistic devices that may signal the presence of a metaphor, including, for example, metalinguistic expressions referring to non-literal-

ness, such as *metaphorically/figuratively speaking* or *so to speak*, general metalanguage about semantics, such as *in more than one sense*, 'mimetic terms' like *image*, *likeness* or *picture*, intensifiers like *literally*, *actually*, *veritable*, etc., and even orthographic devices like quotation marks (see Goatly 1997: 174–175 for an overview). Although it certainly seems to be a promising strategy to extract metaphors on the basis of such markers, no major study so far has applied this method systematically. It should also be noted that an initial evaluation of the method casts some doubt on its utility: Wallington, Barnden, Barnden, Ferguson and Glasbey (2003) find that Goatly's markers do not in fact consistently signal the presence of metaphorical expressions.

Returning to the possibilities potentially offered by semantically annotated corpora, there are two types of annotation that are particularly promising, and that augment the set of possible research strategies:

- (vi) *Extraction from a corpus annotated for semantic fields/domains.* The strategies described in (i)–(iii) can all be adapted, in principle, to corpora that are (comprehensively or selectively) annotated for semantic fields/domains. Extending strategy (i), the researcher can specify a potential source domain and search directly for all lexical items belonging to that source domain (instead of specifying sets of source-domain lexemes that will always be incomplete). An example for this strategy is the work by Semino (2005, this volume), which makes use of a corpus annotated for expressions reporting speech activity. In corpora that are exhaustively annotated, of course, extensions of the strategies in (ii) and (iii) are also possible, i.e., the researcher could specify and search for a potential target domain or for parsing units containing both potential source and target domains. Of course, as mentioned above, the necessary corpora are not currently widely available. Even where they are, however, researchers face an additional problem: semantically annotated corpora may not be consistent with respect to the semantic fields that they assign words to; unless the annotation scheme is informed by considerations of metaphor and metonymy analysis, these semantic fields may simply be assigned on the basis of the target domain. For example, the verb *rise* may be annotated as belonging to the semantic field of QUANTITY in *Inflation rose to an all-time high* and to the semantic field of MOTION in *The plane rose to a height of thirty thousand feet* (cf. Castellón et

al. 2004 for a defense of precisely this strategy). In a corpus thus annotated, expressions manifesting conceptual mappings could not be identified on the basis of the annotation. A more general problem of annotated corpora is, of course, that the researcher has to rely on the annotation (this is also true for studies based on thesauri, for example, Allan, this volume).

- (vii) *Extraction from a corpus annotated for conceptual mappings.* Large corpora annotated for conceptual mappings would be a valuable resource for metaphor research. If such corpora were available, the task of extracting conceptual mappings would become trivial. Of course, in order to create such corpora, the task of annotating metaphorical mappings appropriately in the first place becomes the problem – this problem will be discussed in more detail in Section 4 below.

### 3. Results of the corpus-based approaches

So far, the results of corpus-based approaches to metaphor and metonymy clearly demonstrate its usefulness: relevant data can be examined more exhaustively and more systematically than with more introspective/opportunistic methods, and this has led to a number of potential reassessments of previous analyses, touching on some of the central claims of the conceptual theory of metaphor.

In addition, the focus on the cognitive or conceptual nature of metaphor and metonymy has led to a certain neglect of detailed, bottom-up analysis, and, in consequence, to a disregard of many aspects of the *linguistic* nature of metaphor. Concerning these, there is a whole range of issues that are slowly beginning to be addressed in a systematic way.

#### 3.1. The nature of particular conceptual mappings

A corpus-based analysis of conceptual mappings is faced with and must account for a much broader range of data than introspective/opportunistic approaches. In many cases, this richness of the data inevitably leads to new insights. It may, for example, necessitate a reanalysis of the way that a mapping is best defined, as Semino (this volume) shows when she reanalyzes ARGUMENT IS WAR AS ANTAGONISTIC COMMUNICATION IS PHYSICAL CONFLICT. An attempt at exhaustiveness also requires the researcher to deal with the issue that linguistic expressions may exhibit different degrees of metaphoricality or metonymicity (cf. Hanks, this volume, cf. also Hilpert, this volume, Partington, this volume, Stefanowitsch, this volume).

### 3.2. The importance of particular conceptual mappings

The inherently quantitative nature of corpus data also puts the apparently monolithic importance of some frequently discussed mappings into perspective. For example, Semino (this volume) finds that the two textbook cases of communication metaphors, the ARGUMENT-AS-WAR metaphor and the CONDUIT metaphor, account for just under 50 per cent of all communication metaphors; Stefanowitsch (this volume) reports very similar proportions for previously postulated metaphors in the domain of EMOTIONS. For metonymy, Markert and Nissim (this volume) as well as Hilpert (this volume) also find mappings that are not discussed in the previous literature at all.

Of course, the use of frequency data concerning conceptual mappings is not limited to general assessments of the importance of a given mapping; it can also serve as a basis for determining which mappings are most strongly associated with a particular target domain (see Koivisto-Alanko and Tissari, this volume) or a particular subdomain within a target domain (see Stefanowitsch, this volume).

Finally, corpus data allow us in principle to assess the systematicity of conceptual mappings. For example, Deignan (1999b) finds that often only one of a pair of antonymous source domain adjectives (such as *hot* and *cold*) can be mapped onto a given target domain, and Stefanowitsch (this volume) notes that target domains that are plausibly thought of as opposites are not necessarily significantly associated with source domains that are thought of as opposites (for example, while the source domain LIGHT plays a central role in the target domain HAPPINESS, the source domain DARKNESS plays a relatively minor role in the target domain SADNESS).

Source-domain oriented studies and target-domain oriented studies often complement each other in the investigation of these aspects of conceptual mappings. For example, while source-domain oriented studies often reveal a much broader set of target-domains for any given source item than we might have expected on the basis of introspective data, target-domain oriented studies constrain this range by allowing us to identify those mappings and source domains that are significantly associated with a given target domain.

### 3.3. Structural properties of expressions instantiating conceptual mappings

One of the most intriguing insights gained from corpus-based approaches to metaphor and metonymy is that there are often formal differences be-



tween literal and non-literal uses or between different non-literal uses of a lexical item.

For example, Deignan finds that metaphorical (and metonymic) uses of lexical items frequently prefer a different word class than literal uses (1995, 1999a, this volume). Also, literal and non-literal uses are often associated with different colligates or different grammatical patterns (for metaphor, see Deignan 1999, Hanks 2004, this volume; for metonymy cf. Hilpert, this volume, Markert and Nissim 2002c). Deignan (this volume) even finds that different metaphorical uses of the same source-domain item may prefer different inflectional forms.

Sometimes, these differences can be accounted for by a careful application of the principles of the Conceptual Theory of Metaphor. For example, Deignan (this volume) shows that singular *flame* is typically used in positively construed target domains, while plural *flames* is typically used in negatively construed target domains. She argues that this is due to the fact that the topology of the source domain is preserved in the mapping; a single flame is naturally associated with positive situations (as in the case of the *Olympic flame*), while more than one flame is naturally associated with negative situations (such as uncontrollable fires).

At other times, it seems as though we simply have to accept that there are item-specific differences regarding the participation of source-domain vocabulary in conceptual mappings; such differences are often simply a consequence of conventionalization (lexicalization, grammaticalization, etc.), which naturally leads to the emergence of unique formal properties for different uses of a lexical item (cf. Deignan, this volume, Hanks 2004, this volume, Hilpert, this volume). Hilpert hints at the possibility that such unique properties may play an important role in processing metonymic expressions, in that they potentially allow the hearer to side-step a lengthy inferring process. Clearly, this possibility is worthy of further investigation.

### 3.4. Textual properties of conceptual mappings

Corpus-based approaches to conceptual mappings also allow the researcher to investigate a range of textual and contextual properties of metaphor and metonymy that cannot be captured by introspective/opportunistic methods at all.

In the simplest case, this concerns the importance of conceptual mappings in general or of particular conceptual mappings in particular genres (cf. Koller, this volume, who investigates the type-token ratio of selected



metaphorical mappings to assess how varied a given genre is in terms of the metaphors employed to structure it) or in target-domain related discourses (cf. Partington's (1997, this volume) method for identifying important metaphors in a given discourse area). Thus, while the ubiquity of metaphor and metonymy in everyday language use is an article of faith in the Conceptual Theory of Metaphor, corpus-based studies allow the researcher to put such claims to the test for the first time.

Of course, the corpus-based investigation of metaphors in a given genre or discourse does not stop at the assessment of their general frequency. There is a tradition of text-based metaphor analysis within the Conceptual Theory of Metaphor that precedes strictly corpus-based approaches and that deals with the ideological, social, communicative and cultural functions of metaphor (cf. e.g. Semino and Masci 1996 for the discourse domain *POLITICS*, Jäkel 1997 for *ECONOMY* and *MENTAL ACTIVITY*). This type of detailed qualitative analysis based on manual extraction can be aided and fruitfully complemented by corpus-based methods (cf. Deignan 2000, 2003, Partington 1997, 2003, Cameron 2003, Musolff 2003, Charteris-Black 2004, Koller, 2002, 2003, this volume). In this context, the potential intertextuality of metaphorical expressions is an interesting research area that has hardly been touched upon (cf. Hanks, this volume), as are pragmatic properties of metaphorical expressions (cf. Goatly 1997, Cameron and Deignan 2003).

Finally, corpus-based studies open up completely novel ways of investigating contextually determined processing effects: Martin (this volume) finds that the occurrence of a given metaphor increases the likelihood that the same metaphor will be used again in the immediately subsequent discourse, while lowering the likelihood that the source domain will be referred to literally. The importance of such findings for psycholinguistic models of metaphor processing can hardly be overestimated.

### 3.5. Cross-linguistic and diachronic differences

The reliance on introspection has also led to a certain lack of attention to cross-linguistic and diachronic issues. This is very unfortunate. The existence of general mappings can often be postulated on the basis of introspective data, and in some cases such mappings may even be plausibly assumed to recur in different speech communities across space or time (cf. Lakoff 1993). However, a plausible assumption cannot replace empirical investigation – many mappings do differ across speech communities (Allan, this volume, Koivisto-Alanko and Tissari, this volume), and it is im-

possible to determine this based on introspection. Moreover, even if certain mappings do recur, the precise way in which they are instantiated differs both across languages (cf. e.g. Charteris-Black and Ennis 2001, Chun 2002, Chung et al. 2003, Stefanowitsch 2004) and across time (cf. e.g. Koivisto-Alanko 2000, Tissari 2003, Koivisto-Alanko and Tissari, this volume, Allan, this volume).

There are many questions concerning this variation to which currently only preliminary answers (and often not even these) exist. For example, what are the preconditions that must hold for particular mappings to manifest themselves at any given point in time or in any given speech community? When do metaphorical mappings ‘fail’ to manifest themselves, or to become conventional? Deignan (2003) plausibly claims that this depends on the degree of importance that a culture assigns to particular domains, i.e. that culturally salient domains are more likely to serve as input for metaphorical mappings; as the importance of certain domains changes, this may be reflected in changing metaphors (cf. Koivisto-Alanko and Tissari’s (this volume) brief discussion of the emergence of the *WRAS INSTRUMENT/TOOL/WEAPON* mapping in Early Modern English). In addition, Allan (this volume) suggests that conventional associations of certain source concepts to certain target domains preclude their becoming associated with other cognitively plausible but incompatible target domains (cf. also Hanks, this volume, for discussion).

#### **4. Metaphor identification and annotation**

As was mentioned above, corpora that are manually annotated for (expressions manifesting) conceptual mappings would be an invaluable resource for corpus-based research.

An appropriate annotation scheme must define (i) a reliable procedure for discovering instances of the phenomenon in question, (ii) the attributes that are considered relevant for each instance and the set of values that each of these attributes can take as well as guidelines as to how these values are to be assigned, and (iii) an annotation format. Let us briefly consider each of these aspects in turn.

- (i) *Metaphor/metonymy identification.* In virtually all studies of metaphor, whether corpus-based or not, metaphors are identified and categorized based on more-or-less explicit commonsensical intuitions of the part of the researcher (this includes most of the studies in this

volume). This strategy may be unproblematic for very clear-cut cases, but an exhaustive annotation (and, of course, any potentially exhaustive retrieval) will confront the researcher with many cases that are not clear cut. In these cases, a maximally explicit procedure must be set up, justified on theoretical grounds, and tested for inter-rater reliability. Suggestions for such procedures exist (for metaphor, cf. Steen 2001, 2002a, Crisp et al. 2002; for metonymy, cf. Markert and Nissim 2002a), but so far, they stand relatively isolated, and have not received the intensive theoretical discussion they deserve, nor the broad empirical testing needed to determine whether they can be reliably applied (although initial small-scale studies are promising, cf. Steen and Semino 2001, Steen 2002b, Markert and Nissim 2002b, this volume).

- (ii) *Relevant attributes for metaphor and metonymy.* Relevant attributes seem to include minimally the source domain and the target domain, sometimes as individual attributes, sometimes jointly as a single attribute. Various additional attributes have been suggested, for example, degree of metaphoricity or metonymicity (Markert and Nissim 2002b, Semino and Steen 2001), degree of conventionality (Wallington, Barnden, Buchlovsky, Fellows and Glasbey (2003)), the certainty an annotator feels about annotating something as metaphorical (Wallington, Barnden, Buchlovsky, Fellows and Glasbey (2003)), the inter-rater reliability of specific annotation decisions, or various aspects concerning the complexity of a mapping (Semino and Steen 2001), or the reason for using a metaphor (Trausan-Matu et al. 2001). Such attributes are, of course, defined with respect to particular theoretical frameworks or research questions; only time will tell what attributes are needed and which of them have a broader relevance.
- (iii) *Annotation formats.* From a theoretical perspective, nothing at all hinges on the specific format chosen for representing attributes and their values, but there are at least three arguments for ensuring compliance to SGML (*Standard Generalized Markup Language*) (as in the case of Semino and Steen 2001), or even better, to the subset of SGML known as XML (*Extensible Markup Language*) (as in Trausan-Matu et al's (2001) and Wallington, Barnden, Buchlovsky, Fellows and Glasbey's (2003) annotation schemes for metaphor or Markert and Nissim's (2002a, b, this volume) annotation scheme for metonymies. First, these markup languages are de facto standards in corpus annotation; second, they are open formats, and thus ensure portability across platforms and applications (cf. Markert and Nissim

2002b, this volume); third, they are extremely flexible with respect to the content that can be encoded, and are thus ideally suited to a situation where there is no agreement yet – and possibly never will be – concerning what aspects of the phenomenon under investigation are to be annotated, and how. Finally, of course, SGML/XML annotation keeps text files comparatively human-readable as compared to many proprietary formats (especially if a stand-off format is used, i.e. if the embedded markup contains nothing more than an index number while the actual markup information is placed at the end of the file, as in Wallington, Barnden, Buchlovsky, Fellows and Glasbey (2003)).

## 5. Conclusion

Corpus-based research into the linguistic and cognitive nature of conceptual mappings is still very much in its initial stages. Many methodological issues have to be (and are being) sorted out, and potential research issues have to be identified and tackled systematically and exhaustively.

Nevertheless, the research record so far is impressive. The corpus-based approach has uncovered a wealth of intriguing facts about conceptual mappings that was not known beforehand, and, indeed, that could not have been learned from the traditional, introspective approach. The next decade will no doubt see a continuation of this process of discovery. In addition, corpus-based approaches to metaphorical mappings face two major tasks. First, many of the results are provisional, awaiting more stringent quantification and statistical evaluation. There are studies that point the way to such procedures, and, of course, there is a wealth of literature on statistical methods both within the field of language studies and outside that is just waiting to be discovered by metaphor researchers. The growing awareness in the corpus-linguistic community concerning the importance of strict quantification and sophisticated statistical methods will undoubtedly ensure that these methods will find their way into the relevant research. Second, while many of the facts uncovered by corpus-based approaches to conceptual mappings can be and are being integrated into a broader theoretical discussion, others are not. In those cases where the results are provisional, this is presumably a good thing, since there is not much point in building theories of conceptual mappings on tentative results. However, in those cases where the results seem solid, it is desirable that corpus-oriented researchers propagate their results yet

more emphatically even where they call into question received wisdom. Corpus-oriented researchers are generally very self-confident with respect to their methods; they should increasingly show the same self-confidence with respect to the theoretical relevance of their results.

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