Hans-Jörg Schmid,
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COGNITIVE FOUNDATIONS OF LINGUISTIC USAGE PATTERNS

EMPIRICAL STUDIES

Cognitive Foundations of Linguistic Usage Patterns

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Introduction

Hans-Jörg Schmid and Susanne Handl

1. Background

Significant innovations in theory-building tend to be accompanied by changes in methodology. For example, when generative grammar replaced American structuralism in the 1960s as the leading paradigm in linguistics, performance-based methods were abandoned in favour of introspection. Interestingly, a similar shift did not take place when cognitive linguists started to have a go at the basic assumptions of generativism. This is particularly remarkable in view of the catchword of the *usage-based* approach, which was introduced to cognitive linguistics by Ron Langacker (1987, 1988) to encapsulate the idea that knowledge of grammar is extracted from the actual use of linguistic structures (rather than implemented on the basis of an innate blueprint). While this would suggest that linguists pursuing a *usage-based* approach would actually look for relevant evidence in authentic language use, the introspective method continued to dominate cognitive linguistic research for a surprisingly long time. The required methodological changes were much slower in coming than the outpour of theoretical claims – and have in fact not been achieved in some quarters of the cognitive-linguistic community so far.

In recent years, however, the necessary methodological consequences resulting from a serious understanding of the *usage-based* programme have clearly been recognized. From this perspective, a linguistic approach qualifies as *usage-based* if, when formulating linguistic hypotheses, it takes a thorough look at the actual use of linguistic structures. In the most extreme versions of this view, usage-*based* theories of grammar have been replaced by distinctly inductive usage-*driven* ones. Both usage-based and usage-driven approaches are attractive for cognitive linguistics because they allow conclusions about how lexical, grammatical and pragmatic knowledge finds its way into the minds of the speaker-hearers of a language and comes to be stored there. Thus, by looking into real-life language, cognitive usage-based approaches expect to gain insights into cognitive foundations not only of language use, which has long been the main aim of psycholinguistic research, but also of language structure.

The recent trend towards a usage-based methodology, an important milestone of which is marked by the volume *Usage-based models of language* edited by Michael Barlow and Suzanne Kemmer (2000), manifests itself in a number of different strands. One important impetus has recently come from the empirical work on a usage-based theory of first language acquisition by Michael Tomasello and his team at Leipzig (cf., e.g., Tomasello 2000, 2003; Lieven et al. 2003). In the same period, historical linguistics has seen a move towards usage-based accounts of language change, e.g. in the work of Joan Bybee and Paul Hopper (cf., e.g., Bybee and Hopper 2001; Bybee 2006a, 2006b). Combining the corpus-linguistic methodology with cognitive-linguistic theorizing, linguists such as Dirk Geeraerts and his research group at Leuven (e.g. Tummers, Heylen and Geeraerts 2005), Stefan Gries (e.g. to appear), Hans-Jörg Schmid (2000) and Anatol Stefanowitsch (e.g. Stefanowitsch and Gries 2003, 2006) have tried to tap into the linguistic usage of large populations of speakers by investigating the material collected in computerized corpora.

2. Focus

Attempts to establish plausible links between linguistic data, on the one hand, and assumptions about their cognitive foundations, on the other, can only be convincing to the extent that they rely on observed recurrent linguistic behaviour, no matter whether it is recorded in the form of corpora of authentic language use, studied in linguistic experiments or simulated computationally on the basis of actual usage. For it is only for recurrent patterns of usage that it makes sense to assume that the underlying structure is intra-subjectively stable across time and intersubjectively similar across members of a speech community. Both characteristics are required if a given linguistic form is to be seen as manifesting a stored representation that is part of the 'grammar' of a language or variety of language.

Taking this obligation very seriously, the papers in the present volume all aim to bring together observed patterns of linguistic usage with cognitive-linguistic concepts and models. Equally importantly, all contributions have an empirical basis and show a high level of awareness of the potential and limits of the methodology applied. The methods used range from the investigation of corpora and tailor-made samples of authentic language use to linguistic and psycholinguistic experiments as well as computational simulations based on actual usage.

The linguistic phenomena investigated in the contributions run the gamut from the lexico-conceptual and collocational level to morphological and grammatical categories, constructions and pragmatic functions. Cutting across the grouping of the papers into lexical and grammatical studies that divide the volume into two parts (see below, Section 3), two complementary perspectives of language and cognition are represented: in one set of papers, the established methods of psycholinguistic experimentation, quantitative corpus analysis and computational simulation are exploited to demonstrate the viability and increase the plausibility and force of cognitive-linguistic thinking. The papers in the second group test well-known cognitive-linguistic approaches such as conceptual metaphor theory, the theory of idealized cognitive models and construction grammar against authentic data demonstrating their applicability and explanatory potential, but also their limitations. Both groups include papers reaching beyond the scope of traditional cognitive-linguistic topics, e.g. by taking a critical stance of reductionist cognitive thinking.

3.   The contributions

As mentioned above, the volume is divided into two parts, each comprising five papers. The papers in the first part focus on lexical patterns and their relations to cognitive processes and cognitive-linguistic concepts. They are ordered according to the complexity of the linguistic elements studied, from individual lexical items to concepts and collocations.

The same principle underlies the arrangement of the papers in the second part. Starting with inflectional morphemes and grammatical categories, the grammatical patterns investigated include argument-structure constructions and valency patterns as well as the pragmatic functions of sentence mood.

In the first contribution on the lexicon, **George Dunbar** addresses a problem that has a long history in cognitive semantics, viz. the distinction between ambiguous and vague lexemes. While ambiguous lexemes have traditionally been considered to have a number of distinct senses, vague ones are seen to carry one meaning that is interpreted in different ways depending on actual usage contexts. Taking up a proposal by Tuggy (1993), who pleaded for a scalar approach that treats ambiguity and vagueness as two poles of a continuum, Dunbar describes a computational model implementing this continuum, which is based on a connectionist network

and validated against the lexicographic decisions taken by the corpus-based COBUILD dictionary. Dunbar closes his paper by arguing that the general mechanism underlying his model gives a good account of a number of general cognitive and perceptual phenomena.

The focus of **Dylan Glynn's** paper is also a semantic relation, viz. synonymy. Studying the three near-synonyms *annoy, bother* and *hassle* denoting slightly different aspects of the concept BOTHER, Glynn emphasizes that semantic investigations must take into account not only the lexico-grammatical frames providing patterns for occurrences of individual lexemes, but also use-related and user-related aspects like registers and regional varieties. His approach is corpus-driven and quantitative, and highly sensitive to the power and limitations of the methods applied. In order to come to grips with the highly multivariate data situation, Glynn uses advanced statistical methods such as correspondence analysis and hierarchical cluster analysis. These multidimensional techniques allow him to map usage patterns that arguably correspond to ways of carving up conceptual space as suggested to speakers of English by the grammar and lexicon of that language.

Olaf Jäkel applies the theory of idealized cognitive models (cf. Lakoff 1987: 113–114 *et passim*) to the study of public boundary disputes concerning the highly controversial concepts of LIFE and DEATH. His investigation focuses on the entrance boundary of LIFE, with linguistic material taken from the public discourse on embryonic stem cell research going on in both English (United States) and German (Germany) in the years 2000 to 2002. By close scrutiny of the data collected, Jäkel manages to show how scientists and politicians involved in the stem cell debate quarrel over denotational incongruencies, each party trying to dislocate or relocate denotational boundaries to suit their aims. The conceptual basis of this dispute is provided by diverging cognitive models of LIFE, including the conservative model, which sees life as beginning with conception, and the biotechnical model, according to which human life proper does not begin before *nidation*, a term introduced fairly recently to denote the settling of the foetus in the female womb.

Like Jäkel, **Brigitte Nerlich** studies usage-patterns in public discourse with the aim of unravelling the conceptual framing of public events. Nerlich looks into press releases and interviews published by scientists as well as the press coverage of key events in science and presents two case studies, one on the alleged breakthrough towards the possibility of 'cloning' the first human being in the laboratories of South Korean scientist Woo-Suk

Hwang, and one on the emergence of so-called *superbugs* heralding the *post-antibiotic apocalypse*. In her analyses, Nerlich extends conceptual metaphor theory in order to study the politics and ethics of *discourse metaphors* in authentic contexts. She manages to show how usage-patterns that rely on entrenched conceptual metaphors are deliberately launched and exploited by scientists themselves and by the press to influence public opinion, for example, with the ultimate aim of creating the public hysteria that will force politicians to provide more funding.

Susanne Handl and **Eva-Maria Graf** introduce an acquisitional aspect into the pattern discussion, relating the contextualist notions of idiom principle and open-choice principle (cf. Sinclair 1991) to the cognitive notions of holistic and analytic language processing (cf. Wray 2002). Drawing on the hypothesis that the quality and evolution of recurring word combinations in different stages of linguistic development provide insights into the anchoring and processing of language in the mind, they classify two essential types of word co-occurrences, i.e. lexical collocations and patterns. Their analysis of these types in children's and adolescents' corpora shows that in a phase of predominantly holistic language processing the percentage of lexical collocations is higher, whereas in an analytical phase, speakers produce more patterns, as they have become aware of the separability and combinability of previously unanalyzed linguistic chunks.

The first paper of the second part, authored by **Ewa Dąbrowska**, moves the interest in language acquisition from the lexicon to grammar. Dąbrowska presents two empirical studies which show that children rely on low-level generalizations when acquiring their first language. One study deals with the inflectional marking of the dative singular in Polish, the other with questions with long-distance dependencies in English (e.g. *what do you think you're doing* or *who do you think you are*). In both cases Dąbrowska reports experimental evidence suggesting that low-level schemas are psychologically more basic and often preferred to the higher-level generalizations proposed in the form of 'rules' by generative grammar. What is also striking is that these low-level schemata tend to hinge on prototypical lexical realizations of constructions.

Klaus-Michael Köpcke, **Klaus-Uwe Panther** and **David Zubin** argue for a conceptual-pragmatic approach to explaining gender agreement in German. Providing a wealth of attested examples from various sources they adapt Corbett's (2003) gender agreement hierarchy by replacing Corbett's formal categories with the conceptual-pragmatic functions of specifying, modifying, predicating and reference-tracking. While grammatical agree-

ment dominates in specifying and modifying contexts, conceptual agreement tends to prevail in uses with reference-tracking function, especially when other syntactic factors (like high degree of syntactic embeddedness) and discourse factors (such as narrative concerns) support this choice.

Ulrich Detges tackles a grammatical problem similar to the lexical one dealt with by Dunbar. The French-language phenomenon which he studies from both a diachronic and a synchronic point of view traditionally goes by the name of *imparfait de politesse* and has often been considered a mere usage variant of the 'normal' *imparfait* by many researchers. By means of an in-depth quantitative and qualitative corpus study, Detges is able to show that the so-called *imparfait de politesse* actually encompasses two types of phenomena that should be distinguished, namely one more variable pattern manifesting a range of verbs that invite a metonymic inference yielding a down-toning effect, and another more specific one consisting of *je voulais* ('I wanted') and a *verbum dicendi* such as *dire* 'to say', *parler* 'to speak', *demander* 'to ask', *proposer* 'to propose' etc. While the first type retains many aspects of 'normal' uses of the *imparfait*, the second one has become entrenched as a discourse marker with a present-tense meaning serving a range of specific textual functions. Detges concludes that the second pattern offers a case of a polysemous meaning of a grammatical construction, since *je voulais* + *verbum dicendi* is still motivated by the meaning of the *imparfait*, but too removed for it to be experienced as being derived from the latter by present-day native speakers of French.

Like Ewa Dąbrowska, **Thomas Herbst** addresses the nature and degree of generalizations stored in the minds of native speakers of a language. His focus lies on a comparison of the predictions made by construction grammar, as represented by Goldberg's (1995, 2006) argument-structure constructions, with those (implicitly made) by European valency models of grammar. While the former postulates fairly high-level generalizations assisted by lower-level schemata, descriptions of verbs in terms of their valency patterns have typically been item-specific, as they often defy generalizations based on shared meanings. Herbst's rich data come from diverse corpora as well as the *Valency Dictionary of English* (Herbst et al. 2004), which identifies several hundred valency patterns of English verbs, nouns and adjectives. Herbst concludes by stating that construction grammar is probably better equipped than valency grammar to account for grammatical creativity (cf., e.g., Goldberg's by now notorious … *sneezed the tissue off the table*, 1995: 152). On the other hand, construction grammar still has to find a way of adequately accounting for how the wealth of

item-specific knowledge of grammatical patterns is stored in long-term memory.

Patric Bach and **Dietmar Zaefferer** investigate the pragmatic functions of declarative and interrogative sentences. They compare two languages: German, where interrogatives are marked by subject-operator inversion at the beginning of sentences, and Japanese, where interrogatives are marked by a sentence-final interrogative particle (*ka*). Their main concern is how the difference between assertives and interrogatives is processed cognitively and whether it has an effect on the cognitive representations of the contents of the corresponding sentences. These research questions are investigated with original experiments exploiting the so-called Simon effect, i.e., the observation that ipsilateral responses are faster and more accurate than contralateral ones. By systematically varying the place where visual and verbal information was displayed on the computer screen and the side of the keys that informants had to press on the computer keyboard, Bach and Zaefferer were able to isolate the effect of the assertion-question distinction and the effect of the forward-typing (German) and backward-typing (Japanese) language. They present evidence from their tests suggesting that declarative sentences are processed in a richer and more fleshed-out propositional form than interrogatives and that the types of cognitive representations constructed depend on the position of the interrogative marker in the sentence.

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Part I: Lexical patterns

A computational model of the ambiguity-vagueness spectrum

George Dunbar

1. Introduction

The aim of this paper is to show that key properties of an influential analysis of the distinction between ambiguity and vagueness are also properties of a particular kind of neural network-based computation, implying that these are general properties of cognition, not specific ones of the linguistic phenomenon.[1] In the first section of the paper the theoretical issues are introduced, and in the second the computational model is first described, and then applied to the problem.

The concepts of ambiguity and vagueness describe the relationship between a word form and the different interpretations it can be given. For example, the English noun *cup* can be interpreted to mean a particular type of small domestic container with a handle (e.g. *a tea cup*). Alternatively, it can be used to refer to a sports trophy (e.g. *the F.A. cup*). In addition, each of these senses can be used systematically to refer to certain closely linked entities. For example, *cup* can be used to refer to the competition for which the trophy is the prize, as in the phrase *the third round of the F.A. cup*. At a finer grain, within each of these senses, a range of interpretations is possible. For example, domestic drinking cups come in a variety of shapes and sizes, illustrated in 1(a-e).

(1) a. *tea cup*   (hand-sized, with a little plinth at the base)
     b. *espresso cup*   (smaller, with a flat base)
     c. *breakfast cup* (larger)
     d. *loving cup*   (two handles)
     e. *paper cup*   (no handle)

All of these interpretations are, let us accept, instances of culturally conventional concepts. By that I mean that they recur in the shared experience of speakers of English. They are not novel concepts that need to be mentally calculated on each occasion of use. Rather, at least in principle, they could

simply be remembered. They are therefore candidate senses for the word form.

When a word form can denote more than one sense, we say that the form is ambiguous. From a linguistic point of view, it has traditionally been considered important to be able to determine whether distinct potential interpretations constitute distinct senses, or whether they are generated from a shared more general, more abstract, sense that covers the different interpretations. Various tests have been used to evaluate this, to try to establish a crisp assessment of whether distinct interpretations are distinct senses.

The core theoretical issue motivating this paper is whether such a crisp distinction can be maintained, and so we will move in Section 1.1 to consider those tests more closely. First, to complete the context, we look at some differences in interpretation that – it is generally agreed – do not arise from lexical ambiguity. A given word form can receive different interpretations also in that it can be applied to various specific objects that differ in irrelevant ways. For example, *cup* can be used to refer to a tea cup decorated with a picture of bluebells or a picture of roses, and the type of flower is not relevant to the interpretation of *cup*. Or, to take an even clearer example, the word *tree* can be applied to trees with different numbers of leaves. It is not anywhere seriously argued that *tree* is ambiguous as to the number of leaves the referent has. In such cases, the noun is said to be vague with respect to this aspect of interpretation. *Tree* is vague as to the number of leaves, and *cup* is vague with respect to the form of surface decoration.

A particular kind of ambiguity has been important in cognitive linguistics and in attempts to differentiate ambiguity and vagueness: polysemy. In cases of polysemy, the ambiguous senses are related in meaning. The two senses of *cup* as a domestic vessel, and a trophy, are related in meaning. Both have a bowl-shaped central part, and both typically have handles. Indeed, it is common for victorious competitors to drink from their trophy. In cases of polysemy, then, it is theoretically possible that there is in fact a single sense consisting of the core shared meaning components rather than two distinct senses. In contrast, for cases where the different interpretations are not related in meaning at all, it is difficult to see what meaningful abstraction could cover both. For example, the English word form *pen* can denote a writing instrument or a small enclosure for livestock. These interpretations are not related in meaning, and this homonym is a clear-cut case of ambiguity.

We can, therefore, identifiy three broad groups of mappings from one word form to multiple interpretations. There is clear-cut ambiguity, illustrated by homonyms like *pen*, clear-cut vagueness, illustrated by the leafiness of trees, and an interesting set of cases in between these where an analysis in terms of vagueness or ambiguity is possible. It is in relation to these interesting cases that linguists and philosophers have tried to establish criteria to determine whether in a given case we are faced with ambiguity or vagueness.

Evidence that different traditional tests for ambiguity can produce different results for the same lexeme has led cognitive grammarians to the conclusion that there is no fixed boundary between cases of ambiguity and vagueness, with a continuum of polysemy ranging between these poles (Geeraerts 1993; Tuggy 1993). In an influential paper, Tuggy (1993) analysed this continuum using Cognitive Grammar (Langacker 1987). On his account, to summarize briefly, when meanings are related, as in polysemy, they are linked by a schema. At one extreme the schema, the over-arching concept covering both meanings, is "well-entrenched", but the meanings are not themselves well-entrenched. This represents vagueness. That is, the lexical item corresponding to the over-arching concept is vague with respect to the distinction between the two meanings it covers. At the opposite pole the separate readings of a phonological form are well-entrenched and there is no subsuming schema. This is ambiguity. In between, there can be variation in the salience of the schema or the elaborative distance between schema and instances. In Tuggy's model there is a parameter that adjusts a threshold for salience, so that forms become effectively ambiguous if there is no subsuming schema whose salience is greater than the current threshold.

This paper presents a computational model that implements Tuggy's (1993) account using Adaptive Resonance Theory, a type of connectionist model (Carpenter and Grossberg 1987; Dunbar 1999). The model stores concepts as prototypes. When a new instance is encountered, the model compares it to the stored concepts, and selects the most similar one. It then retrieves the prototype for that concept and compares it to the instance. There are two possible outcomes at this stage. If the instance is sufficiently similar, it is assimilated to the existing concept, whose prototype is modified slightly to allow for variation in the new instance. This corresponds to the case of vagueness. The other possible outcome is that the instance is not sufficiently similar. Then the model will set up a new concept, initially with the novel instance as its prototype. This corresponds to ambiguity, with a

distinct concept being entrenched separately. The computational model contains a parameter termed 'vigilance', and it will be shown in Section 2 that manipulating this generates the ambiguity-vagueness spectrum described by Geeraerts (1993) and Tuggy (1993).

1.1. Traditional criteria for ambiguity or vagueness

The English words *ball* and *aunt* are often used as illustrations of clear-cut ambiguity and vagueness. *Ball* can denote an object that is spherical, a toy, or it can denote a formal event at which people dance. It cannot be used to refer, indeterminately, to something that might be either. It is one or the other, an instance of ambiguity. *Aunt*, on the other hand, can refer to sisters (or sisters-in-law) of a child's mother or father. Its denotation accommodates the siblings of either parent, so that, for example, the phrase *my two aunts* can include someone married to my father's brother, and another married to my mother's brother, indiscriminately. It is vague in relation to these distinctions[2]. Even when I refer to a particular aunt, when I know that she is, say, my mother's sister, the word itself does not carry the distinction.

A number of tests have been proposed to differentiate cases of ambiguity and vagueness. If those tests consistently indicated the same diagnostic conclusion for any given word, things would be simpler, but Geeraerts (1993: 237-254) noticed that they often do not. We can illustrate the problem with three of these criteria, the linguistic, logical and definitional criteria.

The linguistic criterion considers the acceptability of crossed readings for anaphoric phrases. The basis for the test is an assumption that an anaphoric term must have the same sense as its antecedent. When there is a mismatch, this generates a feeling termed *zeugma*. The test works by crossing the two interpretations in question and assessing, metacognitively, whether the crossed interpretation is acceptable. Example (2a) illustrates this with the word *ball*, and the anaphor at the end of the sentence is awkward to say the least. In contrast, (2b) is fine, no matter whether the respective aunts are linked to John's mother or father. The logical test assesses whether contradicting, or cancelling, the term can be acceptable. If a term is ambiguous, then one reading can be asserted, and the other coherently denied. Example (3a) shows that one can do this for *ball*, but (3b) would be considered self-contradictory by a typical native speaker. The definitional criterion examines whether a single definition can be constructed for both

interpretations. If a term is vague, this should be possible. It is difficult to imagine an informative definition covering both senses of *ball*, whereas it is relatively easy for *aunt* (parent's sister or sister-in-law), simply by generalizing from mother or father to parent.

(2)   a.   *John would like to kick a ball and take his wife to one.*
  b.   *John would like to meet one aunt [his father's sister] and talk to the other* [*his mother's sister*].

(3)   a.   *The ball that John kicked is not a ball.*
  b.   *My aunt is not an aunt.*

For *aunt* and *ball*, the three tests are consistent. *Ball* is ambiguous. *Aunt* is vague with respect to the distinction between the mother or father's side of the family. Geeraerts (1993) found, however, that for many words the tests do not give consistent results. For example, the noun *dog*, which can denote all dogs or specifically male dogs, satisfies the logical test for ambiguity, but passes the linguistic test for vagueness.

1.2. Cognitive grammar model

Tuggy (1993) agreed with Geeraerts, concluding that there is no fixed boundary between cases of ambiguity and vagueness, but rather a continuum of gradable polysemy. Tuggy used the example of *paint*, which can refer to a range of activities such as painting a portrait, painting a ceiling, and applying makeup, and applied different tests. Tuggy (1993) was able to formulate a general definition covering the range of these uses, thus satisfying the definitional criterion. However, there were ambivalent results with the linguistic test, where acceptability was greater for more similar uses. He constructed example sentences, such as those in (4), and, using his own native speaker judgements evaluated their acceptability. In these judgements, the issue is whether the 'so has' form can acceptably cover the second interpretation via anaphoric link to the first. Tuggy found that, for example, (4a) is better than (4b). Similarity of meaning was described in terms of the degree to which components of meaning were shared by the senses. For example, uses would be more similar if the fluid applied was liquid in both cases, less similar if one involved a single colour, the other more than one colour, and so on. Thus, there is greater similarity between the interpretations in (4a) than between those in (4b).

(4)   a. *I have been painting [a portrait in oils] and so has Jane [a land-scape in watercolours].*
      b. *I have been painting [stripes on the road] and so has Jane [a land-scape in watercolours].*

For *paint*, then, the definitional test suggests that the verb is vague with regard to these distinctions. However, the linguistic test does not give a clear result, but suggests a continuous spectrum, correlated with semantic distance.

Tuggy (1993) used the framework of cognitive grammar (Langacker 1987) to analyse this spectrum of polysemy. Two readings can be related if they can be subsumed by a common schema. Whether the word is vague or ambiguous with respect to those readings will depend on a number of factors, particularly the relative entrenchment of the readings, the entrenchment of the subsuming schema, the degree of elaboration required to instantiate the readings from the schema, and the salience of the schema. For example, the two interpretations of *ball* are well-entrenched, each being well-established independently of the other, and there is no salient common schema subsuming them. These are the characteristics of ambiguity. Conversely, for the interpretations of *aunt* as mother's and father's sister, there is a salient schema (parent's sister), and only a small amount of elaboration is required to instantiate those interpretations from that schema. Thus *aunt* can have a single, vague sense, covering both interpretations.

Tuggy's key theoretical point is that there is no crisp distinction between ambiguity and vagueness. Rather, there is a spectrum of degrees of unifiability (or, conversely, splitting) of senses. In his account, this gradability is provided for through the gradability of salience and entrenchment, which are related (Tuggy 1993: 280), and the gradability of elaborative distance. The more similar two interpretations are, the shorter the elaborative distance from a common schema potentially can be. Consequently, because degrees of similarity afford degrees of elaborative distance, they allow for degrees of ambiguity within this model. Furthermore, a given schema can be more or less salient as a function of context, leading to different patterns of ambiguity in different contexts. In particular, a schema can only subsume interpretations if its salience exceeds a threshold, and this threshold can vary. Because salience, and the threshold value at which a salient schema becomes relevant, are a matter of degree, there can be degrees of ambiguity. Through these different mechanisms, Tuggy's model establishes a fuzzy distinction between ambiguity and vagueness and ac-

commodates the gradable and sometimes inconsistent results of applying traditional tests of ambiguity.

2. A computational implementation of Tuggy's model of the ambiguity spectrum

The remainder of this paper presents a computational model that can produce the pattern of gradable classifications of ambiguity observed by Geeraerts and Tuggy. The model uses a single computational mechanism, Adaptive Resonance Theory, that is believed to have quite general applicability to cognitive processing, and the ambiguity spectrum is generated as a direct result of manipulating a single parameter of the model. The next subsection describes the mechanism, and the following one evaluates it empirically.

2.1. Adaptive Resonance Theory (ART)

ART is a type of connectionist network model, and so to introduce ART, I will first briefly outline the operation of standard feedforward connectionist networks. Such networks are simpler in design, and so will make it easier to introduce relevant terminology. In addition, the distinctive character of an ART network will be easier to perceive through the contrast with feedforward networks.

The simplest feedforward networks are made up of two sets of units, input and output units, with connections running from each input unit to each output unit. Figure 1(a) illustrates a network with five input units and one output unit. The network has five connections, one from each input unit to the output unit. In operation, the network is presented with an input pattern consisting of four numerical values, one for each input unit. These values set the activity of the input units, and the network 'feeds' information about this stimulated activity forward along the connections to the output unit.

Each connection also has a numerical value associated with it, termed a weight. These weights influence the way information about activity is transmitted along the connection, by a method that I shall illustrate shortly. Thus, the output unit receives information about the activity of the input units connected to it in a form that is influenced by the connection weights. Let's illustrate this now, then, with a concrete example. Imagine that the four input units in Figure 1 are 'feature detectors' that take the value '1'

when the feature is present, and zero otherwise. In Figure 1(b) I have anno-
tated each connection with a weight. You can probably see readily that the
weights will have the effect of emphasizing features of a dog. If the input
pattern 'barks', 'wags its tail' and 'chews bones', positive activity will be
fed forward to the output unit. In fact, what each connection passes forward
is the product of the input activity and its weight, and the output unit sums
those values. For example, if the input pattern is [1, 1, 0, 0, 0] and the
weights are [1, 1, 1, -1, -1], then the net input will be $(1 * 1) + (1 * 1) + (0 * 1) + (0 * -1) + (0 * -1) = 2$.
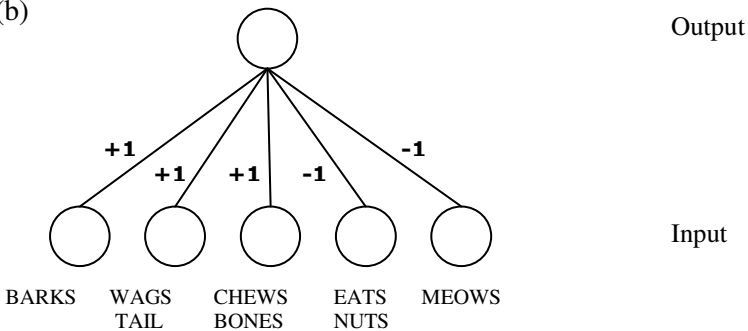
(a)
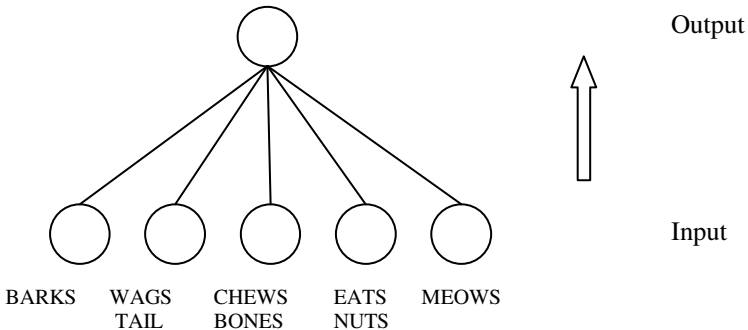
(b)

Figure 1. Feedforward connectionist networks.

The activation of the output unit is then some function of this net input.
Different types of activation function are possible. For example, a threshold
activation function would yield an activity of '1' if net input exceeds a

threshold value, and zero otherwise. Output units with a threshold function are sometimes termed 'decision units'. In our example, the decision would be "Is this creature a dog?".

In this example, I have fixed the connection weights by hand, but there are computational procedures that allow the network to calculate appropriate weights from a set of training examples. Each training example consists of an input pattern and a target output value, which is the value the output unit should take when it responds correctly to this input pattern. From these, the network can estimate the weights it would need to have if it were to produce this target output given the input pattern. The process of calculating weights is termed learning, and takes place over a large number of learning trials, in which the set of training examples is repeatedly presented to the network. On each repeated presentation, the network makes incremental changes to the weights so that it gradually produces values closer to the targets. Networks whose learning method requires that training examples include the target output as well as the input pattern, are said to be 'supervised', since the programmer has to guide learning by providing the correct answer for each training case.

In practice, feedforward networks typically have a third set of units between the input and output units. This extra set of units are termed 'hidden units' and by articulating the connections into a sequence of two sets of connections, they enable networks to learn more complex mappings from input patterns to output responses. To learn weights on connections that are not connected to output units, they must use more sophisticated learning algorithms, such as backpropagation learning. However, in general terms, they operate in the same way as the simpler example just described.

ART was introduced by Grossberg as a biologically realistic model of the way that the cerebral cortex of the brain processes information, and has been developed and applied in a number of domains (Carpenter and Grossberg 1987, 1988; Grossberg 2003). The model is designed to overcome a particular difficulty, termed catastrophic interference, faced by some learning algorithms, such as backpropagation learning in feedforward networks. In these other connectionist models, the entire set of examples to be learned from must be available during the learning phase. If a backpropagation network is trained on a set of examples, its weights are adjusted to produce desired responses by feeding back an error signal based on a target output supplied by a supervisor. Once learning has been completed, the weights are frozen and the network can then be applied to a fresh set of examples. However, further learning with new categories is not practical. If the

weights were now adjusted to accommodate the new examples, the new learning would interfere with the original learning, which would be completely lost. ART, however, can continue to learn new examples without interfering with existing learning. The network remains stable, in the sense that the existing learning is preserved, and yet plastic in the sense that new response categories can be acquired. In addition, it achieves this without a supervisor. This approach seems to better approximate the situation we find in the natural development of lexical categories. That is, native speakers are not explicitly taught which interpretations of *cup* to combine or split into different senses.

Details of the equations governing the behaviour of the network are given in Carpenter and Grossberg's papers (1987, 1988) or any of the many secondary sources now available (e.g. Freeman and Skapura 1992; Gallant 1993; Patterson 1996; see also Dunbar, 1999). In the following paragraphs I will outline the organisation of the model in general terms.

The ART network has two principal layers, roughly input and output, connected with recurrent links so that the response of the second layer can be tested against the input (see Figure 2).
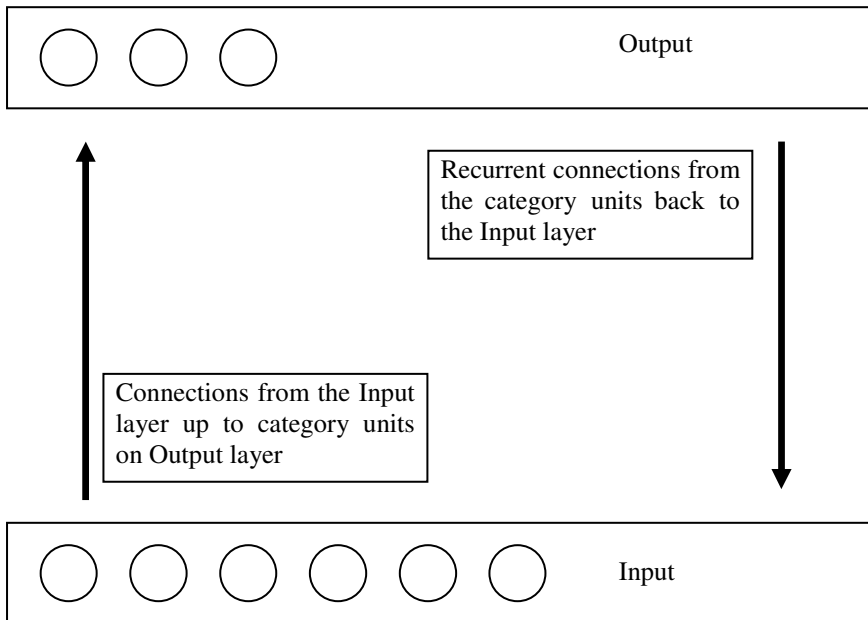

Figure 2. Schematic diagram of an Adaptive Resonance Theory network showing the input layer (at the bottom) and the output layer.

Resonance is achieved only if the recurrent links generate a response that matches the input. Resonance settles the classification of a pattern. If the initial response does not create resonance, then an alternative must be tried. If there are no remaining alternatives, then a new category is created using the novel instance as its prototype. The delicacy of classification is affected by a vigilance parameter. When vigilance is high, a very close match is required, and instances tend to be separated into many different categories. However, for a given level of vigilance, the network itself determines the number of categories. This is in contrast to many other approaches to automatic pattern classification, where the number of categories is determined by a supervisor, and solves the plasticity-stability dilemma by allowing the model to set up new categories to accommodate novel instances without disrupting previous learning.

For example, an ART network might contain prototypes for the categories BIRD, LION, and DOG. These prototypes each exist in the network as a vector of numbers representing typical values for properties. For instance, the prototypes might be as shown in (5), using for illustration just the five specimen properties 'chews-bones', 'barks', 'wags-tail', 'purrs', and 'flies'. For instance, the vector for *bird* in (5a) indicates that the prototype does not chew bones, bark or purr, but it does wag its tail and fly.

(5) a. *bird*   [0, 0, 1, 0, 1]
     b. *lion*   [1, 0, 1, 1, 0]
     c. *dog*   [1, 1, 0, 1, 0]

When a particular input pattern is presented to the network, it is compared to the existing stored prototypes and the closest is selected as the winner. For instance, if network is shown a creature like this [1, 0, 1, 0, 1], the most similar prototype is the one for *bird*. This prototype is retrieved and fed back down the recurrent link to be compared again with the input pattern. Only if it matches sufficiently closely will the classification as a bird be accepted. If the classification is accepted, the prototype for bird will be updated to something like [0.2, 0, 1, 0, 1]. That is, accepting the new exemplar influences the prototype, nudging it a little towards the exemplar. On the other hand, if the match is not close enough, then the novel creature will be placed in a new category of its own. What counts as close enough is determined by the vigilance parameter. When vigilance is high, the match has to be closer, and the categorization of exemplars will be more fine-grained.

For the purpose of modeling polysemy, we can think of the prototypes stored in the network as distinct senses, and the training exemplars as particular interpretations. The model can, without supervision, determine how many distinct senses to represent and, when faced with a novel instance, can either allocate it to an existing sense, or set up a new sense to accommodate it.

Input, which in this case is a vector of real-numbered values for properties, in fact passes through a series of steps before it is filtered through bottom-up weights to the category units in output layer. The preliminary steps serve two purposes. First, they normalize and threshold the input pattern, to deal with signal noise. Second, they incorporate any feedback from the output layer. This feedback signal is combined with the input and cycled forward to the output layer. On the first pass, there will be no feedback and so the signal is simply filtered through the bottom-up weights to the output layer. At the output layer, there is a winner-takes-all competition. One output unit is selected as the winner, and this corresponds to the classification of the input pattern. Identification of this unit effectively retrieves a prototype of the category from the weights on the recurrent connections.

On the next pass through, this prototype is compared to the input using the vigilance criterion to decide whether the match is good enough. If it is, resonance occurs, the classification is thereby confirmed, and the prototype for the chosen category is adjusted slightly so that it is a little more similar to the particular instance just classified. In this way, the representation of existing categories can continue to evolve. If the match does not meet the vigilance criterion, the contest is re-run with the output unit that initially succeeded now eliminated. This continues, if necessary, until all known prototypes have been tried. If the input matches none of them, a new output category is created. The weights on the recurrent connections for the new category are set to match the input category so that a satisfactory match is finally achieved by stipulation. The higher vigilance is, the tighter the criterion, and categorization is only accepted if the match is very good. At lower levels of vigilance, less discrimination is required. This means that when vigilance is high, distinct categories are more likely to be created. When vigilance is low, instances are more likely to be grouped together.

In this type of network, representations of categories exist as prototypes in the weights on connections to a particular output unit. The prototype for a given category is dynamic in the sense that learning takes place every time an instance is accepted following resonance. In this way, the prototype evolves towards the central tendency of the instances encountered.

The network maps onto a model of polysemy as follows. Each net is an idealized representation of a word. Each output unit, with a distinct prototype, corresponds to a specific sense of a word. An input vector corresponds to a particular contextualized use of a word, an interpretation. As the network encounters uses, it classifies them. Uses which are similar are classified together as one sense, their prototype stored as the weights associated with a particular output unit. Uses which differ are classified separately. The degree of similarity required is determined by vigilance. Vigilance thus corresponds to the notion in Tuggy's (1993) model of the salience of the schema linking two senses. In his model, if the salience of a potentially subsuming schema falls below threshold, two senses are not linked.

2.2. Testing the model

In theory ART is capable of generating the expected results. This section describes an empirical test to evaluate whether the model actually does produce that pattern when trained on real data. The question is whether the model allocates interpretations to distinct prototypes, implying ambiguity, or lumps them together, implying vagueness. In addition, we can ask whether varying vigilance generates a gradient, from very fine-grained separation at high vigilance levels, to the coarser lumping predicted when salience is increased or elaborative distance is reduced.

In common with many approaches in cognitive linguistics, I assume a continuity between the interpretations of words in context and general conceptual knowledge. This does imply that there will be individual differences in the representations people form, because they will be influenced by personal experience with the words, and differences in general world knowledge. For this reason, separate models will be built and tested for each participant. Nevertheless, since of course language is used for communication, it is reasonable to expect a good amount of intersubjective agreement.

2.2.1. Input patterns

For this test, the English noun *cake* was used. Each input pattern represents a specific interpretation of the noun, corresponding to one of five possible uses indicated in (6).

(6) a. *A small cake for one person*
     b. *A birthday cake*
     c. *A rice cake*
     d. *A cake of soap*
     e. *A fish cake*

Two steps were involved in creating input patterns. First, appropriate conceptual dimensions were derived from a group of 12 participants using the repertory grid technique (Kelly 1955). The repertory grid technique has its origin in therapeutic psychology, and is intended to be an indirect method of interrogating conceptual organization. It was used to avoid potential demand effects and the possibility that the experimenter might craft the choice of input dimensions to engineer the desired solution. In this method, the different interpretations are presented in sets of three, and the participant has to say which pairs are most similar, and what the basis of that similarity is. For example, a participant might be presented with (6a–c), and respond that (6a) and (6b) are the most similar because they are both sweet. They would then be asked what the opposite of sweet was, to create a conceptual dimension on which different interpretations could be rated. The nine most frequently generated dimensions were used. They were: 'is small', 'is sweet', 'can be eaten', 'is savoury', 'is flat', 'is round', 'is for special occasions and celebrations', 'is for the main part of the meal', 'is for dessert'.

   Input patterns were then created by asking a separate group of 20 participants to rate each use against the nine conceptual dimensions. Ratings were made on a scale from zero (it does not have the property at all) to 10 (it has it to a very high degree). Each pattern, therefore, was a vector of nine values, representing the interpretation as a location in conceptual space. The ratings provided by one participant are shown in (7).

(7) a. *A small cake*   [8, 8, 7, 5, 5, 9, 4, 3, 8]
     b. *A birthday cake*   [4, 8, 7, 5, 7, 9, 10, 0, 8]
     c. *A rice cake*   [8, 2, 8, 7, 3, 8, 4, 5, 6]
     d. *A cake of soap*   [9, 0, 0, 0, 7, 2, 0, 0, 0]
     e. *A fish cake*   [8, 1, 7, 6, 7, 8, 3, 6, 4]

Thus, for example, this participant rated *a fish cake* as having the property of being 'small' to the degree '8', and 'sweet' to the degree '1'.

2.2.2. Lexicographic validation

The makers of dictionaries address a very similar problem to the one we are modelling here. Each dictionary comes to a view about how many distinct entries or sub-entries a particular word should have (and different dictionaries come to different views). When these decisions have not been based on etymology, publishers have traditionally relied upon lexicographic judgement for synchronic descriptions.

An alternative approach was pioneered by the *COBUILD Dictionary* (Sinclair 1987). In a deliberate effort to loosen the traditional dependence on introspective judgement, that project used concordance evidence from a large corpus of contemporary English as the basis for decisions about which usages were distinct. The concordances indicate syntagmatic patterns, and the inference made is that distinct syntagmatic patterns of usage correspond to senses worth distinguishing (Moon 1987). Sinclair (1991: 53-65) illustrated this point with a detailed analysis of the word *yield*. For example, he found that the sense 'to give way' was frequently associated with the structure of an intransitive verb in the corpus, whereas the sense 'to produce' typically took the form of a noun. Over a range of examples like this, he found that "each meaning can be associated with a distinctive formal patterning" (Sinclair 1991: 6). Although Sinclair (1991: 39) conceded that introspection inevitably plays a role in evaluating the evidence from the corpus, it does not, as he pointed out, create the evidence. From our point of view, the important thing is that this means there is a relatively objective, in the sense of not depending on subjective metacognitive judgement, and independent reference point against which to compare classifications formed by our model. To evaluate model performance, then, one thing we can do is compare its analysis to the analysis presented in the *COBUILD Dictionary*, which (8) represents in set notation. *Soap cakes* were listed separately from the four edible *cakes*, with small and large *sweet baked cakes* grouped together.

(8)   {{*small cakes, large cakes*} {*rice cakes, fish cakes*}} {*soap cakes*}

2.2.3. Results

ART has an unsupervised learning algorithm. This means that it does not have access to target patterns or the desired solution during learning. In-

stead, it uses general criteria to work out a classification of the input patterns, and to decide how many prototypes to set up. So when we evaluate its performance by comparing its classification to the normative standard of the *COBUILD* entry, we are comparing it to information the model has had no access to during learning. The comparison is, therefore, quite a strong test.

Separate networks were trained for each participant, across a range of vigilance values. At higher levels of vigilance, finer classifications with larger numbers of distinct prototypes, were created, as anticipated theoretically. For 13 participants (65%), at some level of vigilance the network formed the same classification as the *COBUILD Dictionary* from participants' ratings, first replicating it on average at a vigilance of 0.96. This classification was maintained over a mean vigilance range of 0.09, before lower vigilance began to allow interpretations to slip together, reducing ambiguity.

For example, for the participant whose ratings were illustrated in (7), the model formed the COBUILD classification for vigilance values in the range 0.97 to 0.92, a range of 0.05. At lower levels of vigilance, the four edible cakes formed a single group, with *soap* left as a singleton. When vigilance was 0.98, classification separated all five interpretations into distinct senses. Between this and the COBUILD classification at 0.97, *rice cake* and *fish cake* were grouped together first.

As indicated, for most participants the model generated the COBUILD classification at intermediate levels of vigilance. Data for the other individuals most often led the model to classify *rice cake* and *small cakes* together before any other classifications, which was different to the *COBUILD* analysis. Thus, although there is evidence of individual differences, which was predicted, the model found substantial agreement not only across participants, but also between participants and the *COBUILD* analysis.

By varying vigilance, the model was able to reproduce the ambiguity-vagueness spectrum. At high levels of vigilance, smaller differences between interpretations are emphasized, and the network establishes distinct senses more readily. When vigilance is low, these fine differences are ignored, and the similarities among patterns become more apparent. In this case, fewer distinct senses are established by the network. This corresponds to the situation in which there is a schema that is salient, and that can subsume both patterns, as described by Tuggy (1993). The salient schema connects the interpretations and can link them into a single representation, or

sense. Because vigilance is a matter of degree, the status of distinct senses can vary. When vigilance rises, senses can proliferate.

One useful aspect of this model is that it allows us to reconcile the observation that the distinction between ambiguity and vagueness is unstable (Geeraerts 1993; Tuggy 1993) with the claim that from the perspective of cognitive psychology a crisp distinction between ambiguity and vagueness is theoretically important (Dunbar 2001). At any specific setting of vigilance, for a particular individual, there will be a clear answer as to whether two interpretations are differentiated or undifferentiated. However, by varying the setting for vigilance, we can re-draw the line between categories. To make a very weak play on words, the model lets us have our theoretical cake, and eat it.

A more general account is needed to allow to a greater extent for the complexity of real cognition. This model allows for just one schema to be in play at any time. A general model will need to accommodate the concurrent application of several schemata, and this is a topic of our current work, which also seeks to extend these results to other nouns and to verbs.

The key properties of the model, its ability to generate varying classifications through varying vigilance, its ability to operate without supervision, and its immunity from catastrophic interference, derive from the generic ART model. We have not had to program these properties in an ad hoc way. That these properties emerge from a generic model of the circuits the brain uses to process information is surprising, to me at least, but also useful because it means that we do not need to postulate language specific mechanisms or, worse yet, polysemy specific mechanisms, to account for the patterns observed.

There are other kinds of vagueness, and types of polysemy that are arguably distinct from those discussed in this paper. I will briefly discuss some of these to indicate some limits to its scope. Systematic polysemy, described particularly clearly by Nunberg (1981) is a kind of meaning relatedness that may operate in a different way. A speaker can use a noun to refer to entities that are closely linked to it. For example, *newspaper* can be used to refer to the physical object, to the associated editorial collective, or to the commercial organization. Another example we saw earlier was referring to a competition using the name of the trophy. It is likely that, at least at the point when a noun is first used to refer in this way, the process is essentially pragmatic, depending on shared knowledge. Even once a particular usage has been established conventionally within a language, it may be that the link between senses is of a different sort to that described by the

ART model. This is a possibility because the entities denoted can be onto-logically so different, often physical and abstract objects, that feature comparison does not seem meaningful.

3. Summary

The paper has demonstrated that the ambiguity-vagueness spectrum identified by Geeraerts (1993) and Tuggy (1993) is an emergent property of ART networks. This general mechanism has been shown to give a good account of a number of cognitive and perceptual phenomena (see Grossberg 2003, for a concise recent overview). Moreover, there is a reasonably direct mapping between components of Tuggy's cognitive grammar model of this phenomenon and parameters of the network.

Notes

1. I am grateful to participants in the conference at Munich in 2006 for helpful comments, suggestions, and questions, particularly Dirk Geeraerts. The paper in final form also owes a great deal to the editors, Susanne Handl and Hans-Jörg Schmid, who I must thank for their help in pointing out several ways in which it could be made clearer. Dunbar (1999) contains a technical presentation of these results, including relevant equations.
2. Vagueness is a term also applied to two, closely related, problems that are distinct from the topic here. Some entities have vague boundaries. For example, *the moon's atmosphere* peters out gradually, with no sharp boundary defining its edge. This is a feature of the real entity, not necessarily of our concept of the object. We might well conceptualize the atmosphere as having an effective limit at a certain altitude, and even think of it as having well-defined internal boundaries between layers of atmosphere. The notional underpinning of nominal syntax tends to present entities as bounded, delimited, and individuated (Langacker 1987; Dunbar, 1991). That is, language can present a crisply delimited perspective on an entity that lacks sharp boundaries. Similar considerations apply to the classic philosophical problem of what constitutes *a heap*. If you take one grain from a heap, is it still a heap? We say it is, but then what if this is the second last grain, surely what is left, one grain, cannot be a heap? So the philosophical problem is that it is hard to identify the point at which the collection of grains is no longer a heap, and there is inherent vagueness in the applicability of the term *heap*. The type of vagueness we have been analyzing is different from vagueness about the boundary of an ob-

ject, or the boundary of a category. Rather, it is vagueness with respect to a particular aspect of the interpretation of a word.

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Questions of life and death: Denotational boundary disputes

Olaf Jäkel

1. Introduction: Denotational incongruencies and contested concepts

The analysis of denotational incongruencies by means of comparative investigations of structural field patterns has been introduced recently (see Jäkel 2001, 2003)[1]. Here I mean to suggest that this method of analysis can also be put to use in the investigation of certain kinds of *contested concepts* (Lakoff 1993), namely cases in which the field patterns themselves are under dispute (cf. Jäkel 2006). Such 'boundary disputes' occurring between different interest groups, parties, or ideologies, are not only a reminder of the fact that denotational boundaries are in general open to change over time. They can also reveal a particular sort of linguistic and conceptual interplay between language, culture, and ideology.

The example to be discussed will be the contested concept of LIFE, which has recently come under serious dispute in the political discourse of Western countries such as the United States, England, or Germany. First, when does human life start? And when does it end? In the last decades of the 20th century, debates about the ethics of abortion on the one hand, and of organ transplants on the other hand have left both entrance and exit boundaries of life contested. Opponents of abortion, e.g., favour *conception* instead of *birth* as the start of life, starting an argument that has been refuelled in the context of the most recent debates on embryonic stem cell research and so-called pre-implantation-diagnostics. As regards death, some advocates of organ transplants, on the other hand, argue their case by 'wedging in' a relatively new concept of *brain death* to replace the old definition of *cardiac death*.

My investigation focuses on the entrance boundary of *life*, with linguistic material taken from the public discourse on embryonic stem cell research going on in both English (United States) and German (Germany) in the years from 2000 to 2002. It will be shown how contested issues like these can be analysed as 'boundary disputes' over the denotations of some crucial lexical items, in which the diction used by opposed parties or inter-

est groups gives voice to alternative classifications, categorizations, and cognitive models. Competing construals to be compared in this context include an archaic/simple/naive model and an enlightened model as well as a biotechnological model, a conservative model, and a Jewish model. As idealized cognitive models, none of these have their bases in metaphor or metonymy, but instead they can be analysed as of the image-schematic kind (cf. Lakoff 1987: passim, e.g.: 113–114, 154, 271–273, 283, 453).

2.   *Life* and *death* as contested concepts: Competing construals

To begin with, both *life* and *death* denote temporal concepts. The first and basic definition provided by the *Longman Dictionary of Contemporary English* (*DCE* 2005) has *life* as 'the period of time when someone is alive'. The same source defines *death* as 'the end of the life of a person or animal', marking it as the opposite of *birth* (cf. *CED* 2003).[2] These meaning paraphrases yield a **Simple Model** of LIFE, which is construed as a period of time that starts with birth and ends in death (Figure 1).
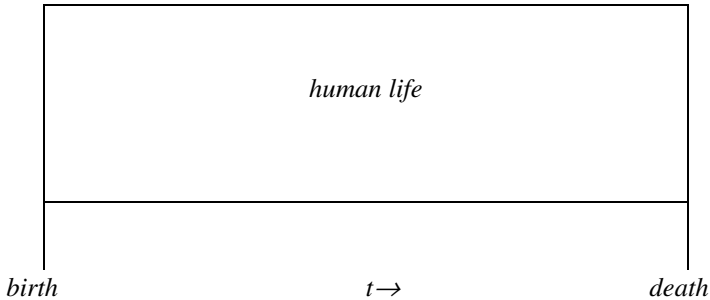
Figure 1. Simple Model of LIFE.

As a field with temporal extension, *human life* includes a number of meronyms, such as *infancy*, *childhood*, *youth/adolescence*, *adulthood*, and *old age*, all of which are separated by highly fuzzy boundaries. But these temporal meronyms (cf. Jäkel 2003) will be neglected in what follows. Instead, the investigation will focus on the outer limits of the temporal field, which at least in the simple model of LIFE are marked by the boundaries of *birth* or *death* respectively.

   This simple cognitive model has probably been with us ever since the days when the first Stone Age thinkers came to the conviction that they, like all human beings, had come as babies from their mother's womb, and that they, like all humans, were not going to live forever, but were bound to die eventually. While this finding may express considerable sophistication if compared to a previous state of blessed ignorance, the simple, archaic model today seems rather naive and dated. This is because the entrance boundary and exit boundary (cf. Jäkel 2003: 164) of LIFE have become contested long ago. In fact, the dictionary definition of *life* quoted above (*DCE* 2005) may already reflect this, in that it makes no explicit mention of *birth* as entrance boundary, and *death* as exit boundary of life. Notice that only ten years before, *Longman DCE* (1995) had defined *life* as 'the period between a person's birth and death during which they are alive'.

   While this simple model of LIFE leaves out any prenatal period as well as lacking any criteria for the determination of death, man's natural curiosity and enquiry into connections of cause and effect led to a growing awareness concerning the nature of those entrance and exit boundaries of life. This growing sophistication is displayed in what may be called a more **Enlightened Model** (Figure 2).
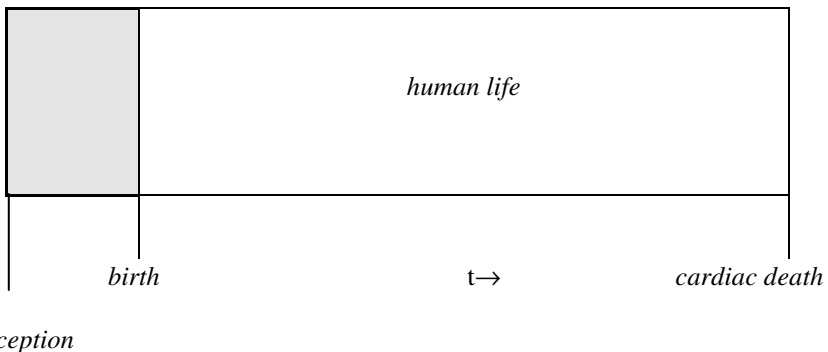
Figure 2. Enlightened Model of LIFE.

This enlightened model of LIFE includes the knowledge that a prerequisite for any human life is a period preceding birth of approximately nine months duration, with this whole process initiated by *conception* – the fertilization of a female ovum by a male sperm. In addition, a first increase in sophistication concerning the exit boundary of life leads to the introduction of the failure of heartbeat and blood circulation as criterion of death, which

in the framework of this enlightened model may now be rendered as the more specific *cardiac death*.

The grey area between the point of conception and the time of birth (cf. *Figure 2*) indicates the rather doubtful status of the developing individual during that period. From when on are we to recognize this as human life which will be regarded as worthy of protection? The debate about the ethics of abortion during the nineteen-sixties and -seventies saw opponents of abortion like the Catholic Church insisting on conception instead of birth as the start of life. While that debate is not the topic of the present investigation, it probably needs to be remembered as the first arena of a conceptual contest involving the entrance boundary of life.

More recent developments in medical technology have resulted in a more complex construal of human life as represented in what may be called a **Biotechnological Model** (Figure 3).
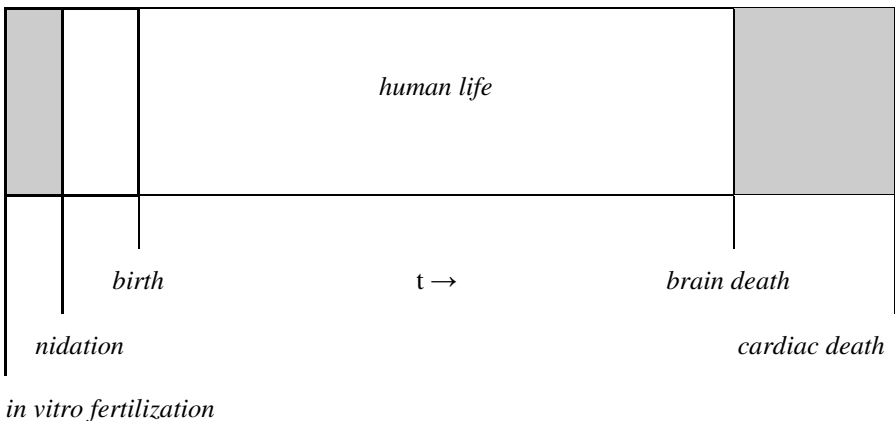
Figure 3. Biotechnological Model of LIFE.

Although this is another topic that will not be tackled in the present investigation, we will start with a short look at the problem zone around the exit boundary of life within the framework of this biotechnological model.

It is those debates about the ethics of organ transplants as well as of some extraordinary cases of euthanasia during the nineteen-eighties and nineteen-nineties that have left the exit boundary of life contested. With the introduction of the relatively new concept of *brain death*, advocates of organ transplants have argued their case, insisting that it is this *brain death* which marks the true end of human life, and not the old criterion of *cardiac death*. By 'wedging in' this new concept into the existing conceptual field,

they have opened another grey area (cf. Figure 3) in which the status of the individual has since become doubtful. And if the period between a person's attested brain death and that individual's cardiac death can be prolonged artificially by means of modern medical technology, this makes organ transplants from the dying individual to some other patients much more feasible. If, on the other hand, some deep coma patients are being attested as *brain dead*, are they to be kept on life supporting machinery?

But these problems concerning the exit boundary of human life, involving the contested concept of death, are only one end of the biotechnological model, and one that will have to be neglected here. Zooming in on the entrance boundary of life, we will now come to the topic which is at the heart of the present investigation. It is the debate about embryonic stem cell research at the beginning of the new millennium that has left the entrance boundary of life contested yet again. And it is the biotechnological model (cf. Figure 3) that enables the replacement of ordinary, natural *conception* by the artificial technique of *in vitro fertilization*, which has not only given birth to 'test tube babies', but has also opened the completely new field of laboratory research on human embryos.

As will be seen from the linguistic material taken from the public discourse on embryonic stem cell research below, yet another concept has entered the debate: The term *nidation* joins the field, denoting 'the settling of the foetus in the female womb', a couple of days after *fertilization*. A technical term so new to everyday English that it has no entry yet in either *CED* (2003) or *DCE* (2005), *nidation* makes for another candidate to mark the true start of human life – at least for some of the contestants. And if it does qualify for that purpose, the introduction of *nidation* into the conceptual field leaves another grey area (cf. Figure 3) between *fertilization* and *nidation*, a period during which the status of the growing organism is rendered doubtful.

Before we go into the analysis of linguistic material, we need to introduce one more cognitive model to contrast with the biotechnological construal: The **Conservative Model** (Figure 4).[3] Taking into account all those new and rather technical concepts of in *vitro fertilization*, *nidation*, and maybe even *brain death*, the conservative model contrasts with the biotechnological model in that it ascribes the maximal extension to *human life*, insisting on *conception* as entrance boundary, and recognizing only one (*terminal*) *death* as exit boundary. Thus, this conservative model represents a construal of LIFE which allows for no grey areas at all (cf. Figure 4), periods in which the status of the individual life would be doubtful in any way.

Figure 4. Conservative Model of LIFE.

Notice that the term *conservative* here does not necessarily imply political partisanship, but rather the inclination of contestants to regard human life as worthy of protection right from conception to (terminal) death.

3. The concept of *human life* in the debate on embryonic stem cell research: The linguistic evidence

In this main section, we will follow the debate on embryonic stem cell research that took place between the years 2000 and 2002 on both sides of the Atlantic, starting with the United States (3.1), to continue with Germany (3.2). For that purpose, we will analyze excerpts from the public discourse in both of these Western societies. The discussion will focus on linguistic evidence for the impact of denotational incongruencies as expressed in those cognitive models introduced above, disregarding a host of other linguistic and discourse phenomena (e.g., the use of metaphor). Although the main arguments in that public discourse will be covered, this investigation can of course make no claim to offer a complete or comprehensive treatment of the extensive debate on stem cell research.

3.1. The debate on embryonic stem cell research in the United States

The central contribution to the debate on embryonic stem cell research in the United States comes from President George W. Bush, who in August

2001 announced his decision to allow federal funding for research on stem cells already extracted from human embryos (Lacayo 2001). His Presidential address to the nation will therefore be analysed below. It was accompanied, though, by a White House fact sheet on embryonic stem cell research, which in turn was based – just like the U.S. President's decision (cf. Lacayo 2001: 27) – on background information provided by the National Institutes of Health (NIH) in a primer on stem cells of six pages. It is with a sample from this document that we will start our analysis.

In May 2000, the National Institutes of Health published "Stem Cells: A Primer" (NIH 2000), a short extract of which is provided in example (1):

(1) a. *Human development begins when a sperm fertilizes an egg and creates a single cell that has the potential to form an entire organism.*

  b. ***This fertilized egg*** *is totipotent, meaning that its potential is total.*

  c. *Approximately four days after fertilization and after several cycles of cell division, these totipotent cells begin to specialize, forming a hollow sphere of cells, called* ***a blastocyst***.

  d. *The blastocyst has an outer layer of cells and inside the hollow sphere, there is a cluster of cells called* ***the inner cell mass***.

  e. ***These inner cell mass cells*** *are pluripotent – they can give rise to many types of cells but not all types necessary for* ***fetal development***.

  f. *Because their potential is not total, they are not totipotent and* ***they are not embryos***.

  g. *In the work done by Dr. Thomson, pluripotent stem cells were isolated directly from* ***the inner cell mass of human embryos at the blastocyst stage***.

What is explained here is a summary of the earliest development of a human embryo, from the *single cell* at the moment of fertilization (1a), the *fertilized egg* (1b), to the multi-cell stage of the so-called *blastocyst* (1c), whose hollow sphere harbours an *inner cell mass* (1d). The individual cells of this inner cell mass are further described as *pluripotent*, unable as such of *fetal development* (1e). The text stresses the point that these cells *are not embryos* (1f) themselves. Provided with this background, the reader is now in a position to understand what embryonic stem cells are and where they come from. Making reference to Dr James Thompson, the pioneer of stem cell extraction at the University of Wisconsin (cf. Lacayo 2001: 30), the

text explains the origin of those cells as *directly from the inner cell mass of human embryos at the blastocyst stage* (1g).

One feature worth noting in the piece of discourse in (1) is the use of referring expressions. Although the excerpt starts with naming the topical *human development* (1a), the text, which deals with the individual stages of this human development, then continues with a sequence of noun phrases composed of technical terms from scientific jargon, a list that in its sum creates the effect of dehumanizing the referents at hand: *a single cell* (1a) – *this fertilized egg* (1b) – *a blastocyst* (1c) – *the inner cell mass* (1d) – *these inner cell mass cells* (1e). This sequence is followed by the culminating claim that these items are *not embryos* (1f), *embryo* probably representing the technical term best known to laypeople as [+HUMAN], and therefore the most 'human' piece of jargon from the whole field. What the whole text does not mention at all is the fact that as a result of the technical procedure of embryonic stem cell extraction, the human embryo supplying the stem cells is necessarily destroyed.

The second document to be analyzed is the "White House Fact Sheet on Embryonic Stem Cell Research", published on August 9, 2001, the day of President Bush's public address on the same topic (White House 2001). The following examples (2–5) are excerpts from that text of two pages.

(2)   *Embryonic stem cells* […] *come* **from the inner cell mass of a human embryo**.

This statement (2) exemplifies the way in which the "Fact Sheet" links up with the background information from the NIH discussed above. One marked difference, though, can be seen in the fact that the White House press release makes no effort at hiding the ethical problem involved by using dehumanizing jargon: Example (2) mentions that the supplier of stem cells is *a human embryo*, and the next example (3) features the even more specific referring expression *a week-old embryo*:

(3)   *To create embryonic stem cells for research, a 'stem cell line' must be created* **from the inner cell mass of a week-old embryo**.

However, one feature of strategic rhetoric can be seen in the double use of the verb *create* in this one sentence (3). This overuse of *create* must be regarded as a euphemism from an author most anxious to characterize the technical procedure of stem cell isolation as something creative rather than destructive.

During his presidential campaign in 2000, George W. Bush had written a letter to the U.S. Conference of Catholic Bishops, in which he promised that "taxpayer funds should not underwrite research that involves the destruction of live human embryos" (as quoted in Lacayo 2001: 28). Now his aides obviously see an urgent need to emphasize the President's religious commitment to preserve human life. The three sentences of the following excerpt (4) have been taken from one short paragraph of the document:

(4) a. *Federal funding of research using existing embryonic stem cell lines is consistent with the President's belief in* **the fundamental value and sanctity of human life***.*
   b. *The President's decision reflects* **his fundamental commitment to preserving the value and sanctity of human life***.*
   c. *Federal funding of medical research on these existing stem cell lines will promote* **the sanctity of life** *'without undermining it'.*

The three references to *the sanctity of* (*human*) *life* (4a, b, c) in rapid succession make this text almost sound like an incantation. Together with *the value of human life* (4a, b), which is characterized as just as *fundamental* (4a) as the President's *commitment* to preserving it (4b), these repetitions underline the importance of the religious background that George W. Bush is so anxious to display to a highly influential fraction of his voters. Whatever his actual decision, they are meant not to doubt the seriousness of his religious conviction. The decision to allow *federal funding of research using existing embryonic stem cell lines* (4a, see 4c) without creating new ones, by the way, is a compromise between the President's wish to promote a very lucrative and competitive area of research and his obligation not to disappoint the religiously motivated among his conservative electorate.

One more argument to relieve any moral misgivings about the President's decision is to be found in the following excerpt (5):

(5) a. *Embryonic stem cells are derived from* **excess embryos** *created in the course of infertility treatment.*
   b. *As a result of standard in vitro fertilization practices,* **many excess human embryos** *are created.*
   c. *Participants in IVF treatment must ultimately decide the disposition of these* **excess embryos***, and many individuals have donated their* **excess embryos** *for research purposes.*

This sequence of three sentences (5a–c) forms one continuous piece of text, in which we find no less than four instances of the referring expression *excess embryos*, one of which is modified by the adjective *human* (5b). The pungent repetition of this newly coined, compound-like phrase certainly is no coincidence. Together with two more instances of *excess embryos* in the remainder of the "Fact Sheet", this passage hammers home a message that cannot be mistaken: They exist – human embryos that have been *created in the course of infertility treatment* (5a), and even in abundance *as a result of standard in vitro fertilization practices* (5b), so that their *disposition* (5c) has become an ethical problem in its own right.

The term *excess* itself already carries negative connotations; dictionary definitions include meaning paraphrases such as 'a larger amount of something than is allowed or needed', 'behaviour which is not acceptable because it is too extreme', or, for the pluralized noun, 'harmful actions that are socially or morally unacceptable' (*DCE* 2005; cf. *CED* 2003). Thus, the compound-like noun phrase *excess embryos* will represent a contradiction in terms at least for adherents to the conservative model of life, who will certainly maintain that there is no such thing as *excess human life* (cf. example 9 below). The rationale of the "Fact Sheet", though, is the opposite: If there are *excess embryos* which need to be 'disposed of' in the first place, then using these for some higher purposes cannot be morally wrong. The constant repetition of the phrase *excess embryos* thus is part of the dehumanizing strategy used to propagate the biotechnological model of life discussed above.

With this we come to the central piece of discourse from the US-American debate on embryonic stem cell research: The U.S. President's "Address to the Nation on Stem Cells" (Bush 2001), a speech that was broadcast live on television at 8:00 p.m. on August 9, 2001. In this speech, George W. Bush appears as a most thoughtful deliberator of a political decision, the serious ethical impact of which he is fully aware of, an impression quite untypical of Bush, who has gained a reputation as a rather clumsy public speaker. The manuscript of the speech of three pages was carefully devised by presidential counselor Karen Hughes, who even coached the President in his rehearsals of its twelve minutes performance (Lacayo 2001: 32). The line of argument is given in the following excerpts (6–12).

(6)   [*A*]*re these frozen embryos* **human life***, and therefore, something precious to be protected*?

In example (6), the President tackles the crucial quandary head-on: *Are these frozen embryos human life*, yes or no? Formulating this polar question, the speaker posits himself on the philosophical meta-level without coming down on either side of the issue yet. Maybe, though, his use of the referring expression *these frozen embryos* is mildly tendentious.

The next example (7) remains on this meta-level, with the President, in what appears to be a deliberate demonstration of honesty, frankly admitting what is at issue:

(7)   [*E*]*xtracting the stem cell destroys the embryo, and thus destroys **its potential for life***.

The honesty resides in the first of the two co-ordinate clauses, whereas the second clause exemplifies the tendency to downplay the ethical issue: Instead of *the embryo's life* it is only *its potential for life*" that is going to be destroyed in the biotechnological procedure.

In the following two longer excerpts (8 and 9), the President can be seen as demonstrating the serious and careful way in which he weighs the pros and cons, with arguments taken from various expert advisers from science and philosophy alike.

(8)   a. *On the first issue, are these embryos **human life** –*
     b. *well, one researcher told me he believes **this five-day-old cluster of cells is not an embryo**, not yet an individual, but **a pre-embryo**.*
     c. *He argued that **it has the potential for life**, but **it is not a life** because it cannot develop on its own.*
     d. *An ethicist dismissed that as a callous attempt at rationalization.*
     e. *Make no mistake, he told me, **that cluster of cells** is the same way you and I, and all the rest of us, **started our lives**.*
     f. *One goes with a heavy heart if we use these, he said, because we are dealing with **the seeds of the next generation**.*

After repeating the crucial yes/no-question (8a), the speaker in this excerpt balances two positions against each other by simply quoting two anonymous sources, *one researcher* (8b–c) against *an ethicist* (8d–f).

The first of these two alleged advisers can be characterized as a proponent of the biotechnological model of life. His extremely condensed argument as related by the President starts with a categorical redefinition of that entity used to supply embryonic stem cells, which he calls *this five-day-old cluster of cells* (8b), using another referring expression which is clearly

intended to dehumanize its referent. The redefinition then claims that this referent is *not an embryo* yet, but a *pre-embryo* only in (8b), introducing another new coinage for the strategic purpose of distinguishing between [+HUMAN] *embryo* and [-HUMAN] *pre-embryo*. The argument continues by withholding from the latter the status of human life – *it is not a life* – and instead assigning to it only *the potential for life* (8c).

The second of the alleged contestants, introduced as *an ethicist* (8d) can be characterized as a proponent of the conservative model of life. He criticizes his opponent's recategorization attempt by 're-humanizing' the so-called *cluster of cells* as *the same way you and I, and all the rest of us, started our lives* (8e). Notice the use of those personal pronouns: First, *you* and *I*, evoking the impression of a very personal, intimate fireside talk between President and philosopher. Secondly, this personal tone is transferred to the speaker's audience, who are likely to feel addressed as well by the inclusive *all the rest of us*, and *our lives*. Finally, the emotive image of *the seeds of the next generation* (8f) emphasizes the gravity of the issue.

The following excerpt (9) sees the President once more as a thoughtful and responsible leader carefully balancing all the arguments before taking his grave decision:

(9) a. *Many argue these embryos* **are byproducts of a process that helps create life**,
     b. *others will argue there's no such thing as* **excess life**
     c. *and the fact that a* **living being is going to die** *does not justify experimenting on it or* **exploiting it as a natural resource**.

Here, the biotechnological model is represented by an argument which reduces those embryos in question to mere *byproducts of a process that helps create life* (9a), another referring expression with clearly dehumanizing effect, downplaying the ethical issue. The conservative model, on the other hand, takes the shape of rejecting the sheer notion of *excess life* (9b), and emphasizing that with the donor embryo *a living being is going to die*, so that *exploiting it as a natural resource* can never be morally justified (9c).

The fact that the President once more uses the strategy of quoting alleged positions from anonymous sources – *Many argue* […] (9a) versus *others will argue* […] (9b) –, carefully counterbalancing one against the other, takes away the responsibility for any of those formulations from himself. Moreover, this strategy seems quite successful in creating the im-

pression of Presidential thoughtfulness and very serious efforts put into the deliberation process.

In the next excerpt (10), the U.S. President comes back to the philosophical meta-level introduced previously in his speech (examples 6 and 7), once again formulating the categorical questions and the basic ethical problems involved:

(10) a. *At its core, this issue forces us to confront **fundamental questions about the beginnings of life** and the ends of science.*

   b. *It lies at a difficult moral intersection, juxtaposing **the need to protect life in all its phases** with the prospect of saving and improving life in all its stages.*

The first statement (10a) rightly identifies the *questions about the beginnings of life* as the central problem underlying the whole debate on embryonic stem cell research, which is the reason why those competing construals of LIFE play such an important role in this debate. Notice the rhetorically clever, if not brilliant, juxtaposition of *the beginnings of life* and *the ends of science* (10a), which give the latter of these two noun phrases an ambiguity certainly intended by the author of those lines: The phrase can be interpreted to mean 'the aims and purposes' as well as 'the limits or limitations' of science.

The second statement (10b) includes another rhetorical double unit, which here has the function of summarizing the ethical dilemma involved in the President's decision: Human life is at issue on both sides of the bargain, with *the need to protect life* from its earliest – embryonic – phases on the one hand, and on the other hand *the prospect of saving and improving life*, namely that of medical patients hoping for revolutionary cures envisaged to come from embryonic stem cell research.

If the recognition of the embryo as a phase of human life implied in this excerpt (10b) seems to give voice to the conservative model of life, this impression is strengthened by the following example (11). Echoing the White House "Fact Sheet" (cf. the discussion of example 4 above), George W. Bush is anxious to express his religious commitment:

(11) a. *I also believe human life is a sacred gift from our Creator.*

   b. *I worry about a culture that devalues life,*

   c. *and believe as your President I have an important obligation to foster and encourage respect for life in America and throughout the world.*

Here the President simply confesses his belief that (each) human life is sacred because God-given (11a). Moreover, his belief system includes a particular mission for himself as U.S. President, namely to counteract regrettable tendencies to *devalue life* (11b), and *to foster and encourage respect for life*, even on a worldwide scale (11c). The purpose of this passage is certainly to please and pacify the religiously motivated among Bush's conservative voters.

After all these rhetorical efforts, with the meta-level philosophizing, the honest deliberation of arguments pro and con, and the evocation of a strong religious background, it may come as a little surprise that George W. Bush's final decision (12) is one that seems to embrace the biotechnological model of life rather than the conservative construal:

(12)   *I have concluded that we should allow federal funds to be used for research on these existing stem cell lines, **where the life and death decision has already been made***.

The decision is the compromise of allowing and therefore funding research on already existing stem cell lines (12) only, while banning the creation of new ones by way of destroying further embryos. The reasoning expressed here may be called pragmatic: With existing stem cell lines, *the life and death decision has already been made* (12); donor embryos have already been destroyed, so we might as well use and exploit those stem cells extracted from them for medical research purposes, without moral qualms – this compromise decision announced by President Bush in August 2001 still holds today, six years after its implementation.

3.2. The debate on embryonic stem cell research in Germany

Whereas the US-American debate on embryonic stem cell research was more or less a Presidential affair, with the Bush administration monopolizing the decision-making process from beginning to end, the debate took a very different shape in Germany. It was characterized by more than eight months of public political discourse with a great variety of contributions from scientists, medical doctors, philosophers, and politicians, culminating in a comprehensive Parliamentary debate on January 30, 2002. At the end of that debate, the members of the German *Bundestag* came to a democratic majority decision, which puts a general ban on embryonic stem cell re-

search, with a very restricted import of existing stem cell lines as the only
exception allowed.

In this section, we will look at a number of excerpts (13–21) from this
public discourse which represent some of the typical arguments that were
exchanged in the debate. The first comes from a 'landmark' speech held by
Federal President Johannes Rau on May 18, 2001, in Berlin (*Die Zeit –
Dokument* 2002: 32–37). The passage below (13) starts by making refer-
ence to the German *Embryonenschutzgesetz*, the relevant Parliamentary
legislation from 1991 which had installed the protection of human em-
bryos:[4]

(13) a. [*Die Abgeordneten des Deutschen Bundestages*] *haben* **als Beginn
des schutzwürdigen menschlichen Lebens die befruchtete Eizelle**
festgelegt.
'[The members of the German parliament] determined **the fertil-
ized egg cell as the beginning of human life worthy of protec-
tion**.'
    b. *Wer die Auffassung nicht teilt, dass menschliches Leben mit diesem
Zeitpunkt beginnt, der muss die Frage beantworten:* **Ab welchem
anderen Zeitpunkt** *sollte menschliches Leben absolut geschützt
werden?*
'Those who do not share the opinion that human life starts with this
date must answer the question: **From which other date onwards**
ought human life to be protected absolutely?'
    c. *Und warum genau erst ab diesem späteren Zeitpunkt?* **Wäre nicht
jede solche andere Grenzziehung willkürlich** *und dem Druck auf
neuerliche Veränderung ausgesetzt?*
'And exactly why only onwards from that later date? **Wouldn't
any such other boundary be arbitrary**, and exposed to pressure
for further change?'

When Johannes Rau refers back to the Parliamentary legislation from ten
years before, determining that human life starts with the fertilized egg cell
(13a), which is therefore worthy of protection, he himself is in full agree-
ment with this position, which gives voice to the conservative model of life.
The following argument he brings in to support this model is based on the
'naturalness' of *fertilization* as the entrance boundary of human life. Rau's
question, *which other date* could provide a better entrance boundary (13b),
points to the central challenge for any contestants opposed to the conserva-
tive model. And though the German Federal President thoughtfully contin-

ues with more questions (13c), these are merely rhetorical, as the speaker clearly indicates his opinion that *any other such boundary* would indeed be arbitrary.

One prominent answer to the Federal President's challenging questions comes from Prof. Dr. Hubert Markl, President of the Max-Planck-Society, in an address to the Society's 52nd General Assembly given on June 22, 2001 (*Die Zeit* – Dokument 2002: 38–43). The following excerpt (14) quotes some crucial passages from that speech:

(14) a. *Jede geborene menschliche Person ist etwas einmalig Neues, das sich aus einer befruchteten menschlichen Eizelle entwickelt hat.*
'Every human person born is something uniquely new, developed from a fertilized human egg cell.'

b. *Aber deshalb ist **diese befruchtete Eizelle noch lange kein Mensch**, jedenfalls nicht als eine naturwissenschaftlich begründete Tatsache.*
'But with that said, **this fertilized egg cell** is **nowhere near a human being**, at least not as a scientifically established fact.'

c. ***Die eigentliche 'biologische Entscheidung' zur Menschwerdung** fällt daher tatsächlich mit der **Einnistung des Keimes im Uterus**, nicht schon mit der Befruchtung.*
'**The real 'biological decision' for the creation of a human being** [anthropogenesis] is actually made with **the settling** [nidation] **of the germ in the uterus**, not as early as with the fertilization.'

The scientist Markl states the truism that *every human person […] has developed from a fertilized human egg cell* (14a) only in preparation of the much more controversial statement that follows, namely that *this fertilized egg cell* is *nowhere near a human being* (14b). This categorical negation prepares the ground for the speaker's final point, which is the proposal to replace *fertilization* as the entrance boundary of human life by *the settling of the germ in the uterus* (14c), a date which according to Markl is not chosen arbitrarily, but which marks *the real 'biological decision' for the creation of a human being*. This unhedged postponement of the entrance boundary of life to *nidation* represents one of the most pronounced contributions from an outspoken proponent of the biotechnological model of life in the whole debate. It is certainly no coincidence that this contribution comes from one of the leading representatives of scientific researchers in Germany, scientists whose striving for maximal freedom for their research purposes does not come as a big surprise.

But what about the applied end of scientific research, what about the medical profession? In view of those promises of revolutionary new therapies and miracle cures for some of today's most incurable diseases that were given by some advocates of unlimited embryonic stem cell research, one could have expected medical doctors to be among the most interested in those scientific advances. But the opposite is true, as the following two examples (15 and 16) show.

In reaction to Hubert Markl's speech (14), Prof. Dr. Jörg-Dietrich Hoppe, President of the Federal Association of Medical Doctors, made a short public statement on July 12, 2001 (Bundesärztekammer 2001), the final sentence of which is quoted here:

(15)   ***Die befruchtete, entwicklungsfähige Eizelle ist** und bleibt schützenswertes **menschliches Leben**, das nicht zur Disposition gestellt werden darf.*
        '**The fertilized egg cell with its potential to develop is**, and will remain, **human life** worthy of protection, which must not be at anybody's disposal.'

This example (15) is clear enough in its rejection of Markl's attempt to dislocate the entrance boundary of human life. The President of the Federal Association of Medical Doctors absolutely refuses any biotechnological construal, speaking up in favour of the conservative model of life.

In this, he is seconded by Prof. Dr. Christoph Fuchs, Leading Executive of the Federal Association of Medical Doctors, who on October 8, 2001, was a panellist in a public hearing on embryonic stem cell research in Hamburg (*Hamburger Abendblatt* 09/10/2001). The following excerpt (16) gives his central contribution:

(16) a. *Wann beginnt schützenswertes menschliches Leben?*
         'When does human life worthy of protection start?'
    b. *Für den Arzt **beginnt menschliches Leben mit der Verschmelzung von Ei- und Samenzelle**.*
         'For the medical doctor, **human life starts with the fusion of egg cell and sperm.**'
    c. *Und wir sollten uns sehr wohl überlegen, ob wir **dieses Leben** mit einem abgestuften Lebensschutz versehen wollen.*
         'And we ought to think twice if we want to provide **this life** with a graded life protection.'

Having asked the crucial meta-level question about the entrance boundary of human life (16a), Christoph Fuchs gives an unambiguous answer by identifying *the fusion of egg cell and sperm* (16b), an answer that he feels confident enough to generalize as the position of any medical doctor. Based on this conservative model of life, he also rejects the idea of providing only *a graded life protection* for the fertilized egg cell, for which he uses the unmistakable referring expression *this life* (16c).

  After these firm proponents of the conservative model of life, we will continue with a look at the opposite position, in the form of a longer excerpt (17) from an interview Richard Schröder, prominent SPD politician and protestant theologian, gave in December, 2001 (*Der Spiegel* 12/10/2001):

(17) a. [*Ab wann ist der Mensch ein Mensch?*] *Uneingeschränkt: **mit der Geburt**.*
    '[From when on is a human being a human being?] Without reservation: **with birth**.'
  b. ***Zuvor ist er ein werdender Mensch**.*
    '**Before that, he is a human being in the making**.'
  c. *Der Begriff 'Embryo' erweckt leicht falsche Vorstellungen.*
    'The term 'embryo' can easily evoke misconceptions.'
  d. *Es geht um **befruchtete Eizellen vor Beginn der Schwangerschaft und in einer Größe von 0,1 Millimetern**.*
    'We are talking about **fertilized egg cells before the beginning of pregnancy, which are 0.1 millimetres in size**.'
  e. *Es widerspricht unserer Intuition, **diese mikroskopisch kleinen Gebilde** als Mitmenschen anzusprechen.*
    'It goes against our intuition to address **these microscopically small forms** as fellow human beings.'
  f. *Wenn **diese kleinen Kugeln** wirklich Menschen wären, warum beerdigen wir sie nicht, wenn sie verloren gehen?*
    'If **these tiny balls** really were human beings, why don't we bury them in case they are lost?'
  g. *Ob ein gegebener Embryo die Schutzwürdigkeit **menschlichen Lebens** genießt, hängt einzig und allein davon ab, ob es sich um einen **werdenden Menschen** handelt.*
    'If a given embryo enjoys the sanctity of **human life** depends entirely on whether it is a **growing human being**.'

In answer to the interviewer's question, Richard Schröder introduces a categorical distinction: Only from the moment of *birth* will he speak of a *human being* in the full sense *without reservation* (17a), whereas up to that moment the referent is only *a human being in the making* (17b). Next, this ethicist throws doubt upon the use of the term *embryo*, which *can easily evoke misconceptions* (17c). The 'misconceptions' Schröder means here are those [+HUMAN] attributes of the lexeme *embryo* analyzed above (example 1), as becomes obvious from the description he suggests instead: *fertilized egg cells before the beginning of pregnancy, which are 0.1 millimetres in size* (17d). Together with the following [-HUMAN] referring expressions, *these microscopically small forms* (17e), and *these tiny balls* (17f), which Schröder uses coreferentially, this is another case of deliberately using de-humanizing jargon in support of the biotechnological model of life. The speaker's argument ends with his differentiation between two categories of embryos: the embryo 'proper', which *enjoys the sanctity of human life* because *it is a growing human being* (17g), as against the other one that does not, a possible object of research, from which even the term *embryo* should be withheld.

With this we come to discourse data from the 'historical' Parliamentary debate on stem cell research, which took place on January 30, 2002 (Deutscher Bundestag und Bundeszentrale für politische Bildung 2002). This comprehensive debate displayed a wide variety of positions on the contested issue, which did not follow party lines. In fact, the members of Parliament were given freedom to vote as individuals in the final decision. The following four excerpts (18–21) can only give a very limited impression of how some of the politicians from different camps argued their cases. Furthermore, just like the other excerpts, the data are here only analyzed for evidence of those competing construals of life.

The first excerpt (18) from the Parliamentary debate comes from Edzard Schmidt-Jorzig, a Liberal Democrat (FDP):

(18) a. *Ich bezweifle sehr stark, dass **die Blastozyste**, also **der Frühzell-verband**, bereits ein würdefähiger Mensch ist.*
'I doubt very much that **the blastocyst**, that is **the early cell cluster**, is already a human being with a potential for dignity.'

b. *Ich jedenfalls kann an der Verwendung **frühester, noch gänzlich individuumsferner Zellsubstanzen** für hochwertige, ernsthafte Ziele nichts per se Verwerfliches erkennen.*

> 'I cannot see anything wrong with the use of **earliest cellular substances, which are far from being an individual**, for high ranking, serious goals.'

The referring expressions used by this speaker, *the blastocyst*, *that is the early cell cluster* (18a), and *earliest cellular substances*, *which are far from being an individual* (18b), again are intended to demote the referent from the status of *human being* to something less, an object, or even only a *substance*, that can be utilized for research purposes. The politician Schmidt-Jorzig clearly embraces the biotechnological model of life, a conviction that he shares with his fellow Liberal Democrat, Wolfgang Gerhardt, whose Parliamentary speech includes the following excerpt:

(19)   *Mir will nicht einleuchten, dass **Zellverbände, die ihrem Schicksal in Tiefkühlfächern in Deutschland nicht entgehen können**, […] nicht benutzt werden können, um ein Stück Erkenntnis zu gewinnen und damit Menschen helfen zu können.*
'It does not make sense to me that **cell clusters, which cannot escape their fate in deep freezers in Germany**, cannot be used in order to obtain some knowledge and thereby help people.'

This statement (19) contains another dehumanizing referring expression, which it combines with yet another point to support the biotechnological argument: *cell clusters*, *which cannot escape their fate in deep freezers in Germany*. Gerhardt insinuates that the referent is [-HUMAN], mere *cell clusters*, and moreover, these are doomed anyway, so why not make profitable use of them?

After these two adherents to the biotechnological construal, we will look at two contributions to that Parliamentary debate which come down on the other side of the fence. The first (20) is a short excerpt from the speech of Wolfgang Wodarg, Social Democrat (SPD):

(20)   *Ich denke, **die Tötung von Embryonen** zur Gewinnung von Stammzellen kann durchaus als **die früheste Form der Tötung eines Menschen** zur Gewinnung von Organen empfunden werden.*
'I think that **the killing of embryos** in order to obtain stem cells can truly be regarded as **the earliest form of killing a human being** in order to obtain organs.'

For this speaker, the embryo even in its earliest stages is certainly a human being, thus endowed with the earliest form of human life, which is why Wolfgang Wodarg will speak of *the killing of embryos in order to obtain stem cells* (20), instead of using the more 'neutral' – and less '(re)humanizing' – expression *the destruction of embryos*. The rhetoric describing *the killing of embryos* as *the earliest form of killing a human being* is highly emotional, a powerful statement in support of the conservative model of life.

The last example to be analyzed from that Parliamentary debate comes from Hermann Kues, Christian Democrat (CDU):

(21)   *Wenn **der Mensch mit der Verschmelzung von Ei und Samenzelle beginnt**, dann kommt ihm von diesem Zeitpunkt an eine unverfüg-bare Würde zu – unverfügbar für den Staat, die Gesellschaft und die Mitmenschen.*
       'If **the human being begins with the fusion of egg and sperm**, then he holds a dignity which must not be at the disposal of the state, the society, or his fellow human beings.'

Compared with example (20), this statement (21) is certainly much less emotional and much more cautious in tone. Nevertheless, it is based on the very same construal, the conservative model of life. As the linguistic context of his contribution shows, Hermann Kues really argues that *the human being begins with the fusion of egg and sperm*, even though the sentence quoted (21) only presents this in the conditional clause. That this statement argues for the earliest possible entrance boundary of human LIFE should be clear by now.

3.3. Coda: Putting the debate into perspective

Even though the political decision in Germany – banning embryonic stem cell research in general, with a very restricted import of existing stem cell lines as the only exception allowed – was made at the end of that Parliamentary debate, the public discourse on stem cell research has not stopped there. From the course of the debate up to then, though, we could reasonably expect future contributions to the discourse on stem cell research, like, e.g., arguments for or against so-called pre-implantation-diagnostics, to be based either on the biotechnological construal, or on the conservative model of LIFE.

However, this does not mean that completely different construals of LIFE are impossible. Different cultures might have other candidates than *conception* or *nidation* to mark the entrance boundary of human LIFE. We could, for instance, easily envisage 'the moment when a pregnant woman first feels the embryo move in her womb', a date even later than that of *nidation*, to play a much more important role than it does in Western societies such as the United States, England, or Germany. The languages spoken in those different cultures would in all likelihood have come up with a lexicalization for that concept, whereas in both English and German there is only a lexical gap.

But relativity starts at home, and we only have to look at one further commentary made within the public discourse on stem cell research in Germany to find evidence of yet another cognitive model of LIFE. It comes from Dr. Joel Berger, speaker of rabbis in Germany, who in late January 2002 (*Hamburger Abendblatt* 29/01/2002) made the following statement:

(22) *Für uns Juden **beginnt das menschliche Leben erst mit der Geburt**, vorher hat sich Gott noch nicht entschieden.*
      'For us Jews, **human life starts only with birth**, God has not decided before that.'

This statement (22) is explicit enough: It has *birth* as the crucial date marking the entrance boundary of human LIFE. Though the **Jewish Model** (Figure 5) exemplified in the rabbi's commentary (22) bears some resemblance to the enlightened model introduced above (see Section 2), it differs from that construal in important ways. Whereas in the enlightened model, the question of regarding *birth* or *conception* as entrance boundary of LIFE is left open, the Jewish model draws a very clear denotational boundary at *birth*, excluding the whole period between conception and birth from the extension of the concept of human LIFE, with reasoning based on religious grounds. The result may even be found to resemble the simple/archaic model analyzed above (see Section 2), but the Jewish model, of course, is completely aware of the sophistications displayed in those more recent competing models, and anything but naive. It entails a different decision than its competitors, one that may be labelled pragmatic. Notice that in the discussion above (in Section 3.2), it is Richard Schröder's contribution (example 17) that seems to include some faint echoes of the rabbinist reasoning, without embracing the Jewish model.
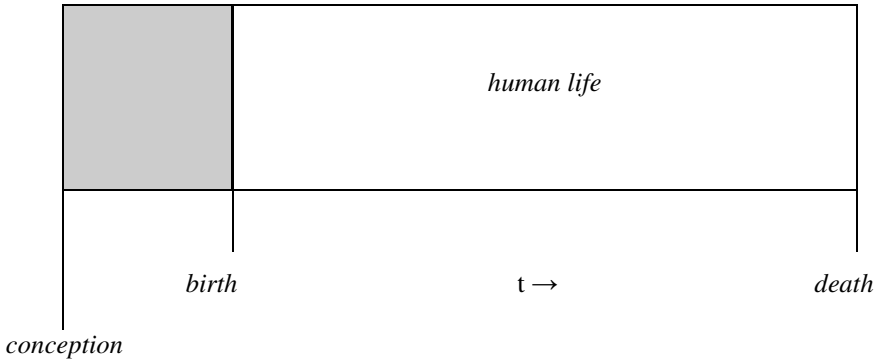
Figure 5. Jewish Model of LIFE.

Before we end this section, there is one more aspect that may be taken into account in order to put the whole debate on stem cell research and the contest between those competing construals of LIFE into perspective. It is formulated by Prof. Dr. Therese Neuer-Miebach, from the Technical College (*FH*) Frankfurt, member of the Parliamentary Commission as well as of the National Council on Ethics, who in late January 2002 (*Hamburger Abendblatt* 29/01/2002) was quoted with the following:

(23) *Der Anfang des Lebens ist eine kulturspezifische Setzung. Alles andere ist Schmu.*
      'The beginning of life is a culture-specific fixture. Anything else is swindle.'

This statement (23), announcing that the entrance boundary of LIFE is nothing but a man-made, arbitrary, and culture-specific construal, calls into doubt any of the diverse arguments claiming the existence of an objective, non-arbitrary boundary. Neither *conception* (cf., e.g., examples 13 and 16), nor *nidation* (cf., e.g., example 14), nor even *birth* (cf., e.g., examples 17 and 22) has any privileged claim to that status, and we should not believe any of the contestants claiming otherwise. Moreover, the fact that there simply is no natural or God-given landmark determining the entrance boundary of LIFE, is the reason why it was possible for HUMAN LIFE to become a contested concept in the first place. Given the rise of ethical conundrums necessitating political decisions, such as the issue of embryonic stem cell research, this dispute was perhaps unavoidable.

4.   Summary and conclusion

The main body of this paper (section 3) has presented an analysis of public discourse data from the political debate on embryonic stem cell research taking place between the years 2000 and 2002 in the United States (3.1) and in Germany (3.2). The focus of this analysis was on the denotational boundaries of *life* as occurring in the documented usage of different speakers, and in particular on the contested entrance boundary of *life*. The discourse data were taken as linguistic evidence of various underlying construals, which were introduced and analyzed above (in section 2) as competing cognitive models of LIFE. If the role of the **simple model** as well as of the **enlightened model** was merely to provide some historical background for the cognitive semantic analysis, the **biotechnological model** and the **conservative model** were the main construals motivating the denotational boundary dispute surfacing in those discourse data from the United States and Germany, with the **Jewish model** playing only a minor role.

Regarded as a particular subtype of *denotational incongruency* (cf. Jäkel 2001), this contested concept of LIFE makes for a case of *staggered incongruency*, a quite common type of incongruency in which the denotational boundaries between the lexemes in question do not meet head-on, but face each other in a 'staggered' way (Jäkel 2001: 158–159) in combination with *alternative classifications*, a complex type of incongruency affecting various levels within lexical (hyponymic or meronymic) hierarchies (Jäkel 2001: 163–165). However, some of the ramifications of this case study for my general approach to the comparative investigation of semantic fields, as well as for critical linguistics, will have to be discussed elsewhere (Jäkel in prep.).

Linguistic evidence came first and foremost in the form of referring expressions, the choice of which could be ascribed to the speaker's adherence to one of the competing construals of LIFE. For a short summary, we can list the most typical of these referring expressions here once more. Even though this retrospect concentrates exclusively on English expressions, it should be noted that most of these have their German equivalents, as was shown above (section 3.2).

The discourse from adherents to the **conservative model** of LIFE was found to be characterized by the repeated use of the following referring expressions (24) for the crucial referent, which for lack of a neutral term we might call *donor entity*:

(24)   – *a (week-old) human embryo,*
         – *a living being,*
         – *a/the human being,*
         – *this life.*

That the repeated use of these terms is meant to emphasize the point that the referent is a living human being [+HUMAN], was analyzed above. With the same purpose, some proponents of this conservative construal are inclined to talk about *the killing of human embryos*, whereas their opponents would rather speak about the same activity as *the destruction of human embryos* – that is, if those opponents would use the referring expression *human embryos* at all for the *donor entity*.

The list of characteristic referring expressions (25) found to be repeatedly used in the discourse from adherents to the **biotechnological model** of LIFE is long:

(25)   – *the blastocyst,*
         – *these excess embryos,*
         – *excess life,*
         – *the early cell cluster,*
         – *this (five-day-old) cluster of cells,*
         – *cell clusters, which cannot escape their fate in deep freezers,*
         – *a pre-embryo,*
         – *byproducts,*
         – *fertilized egg cells before the beginning of pregnancy, which are*
           0.1 millimetres in size,
         – *these microscopically small forms,*
         – *these tiny balls,*
         – *earliest cellular substances, which are far from being an indivi-*
           dual.

As was analyzed above, the deliberate and repeated use of expressions like these serves the main purpose of dehumanizing the *donor entity*, with the explicit denial of the term *embryo* for this referent contributing to the same effect.

This list (25) includes terms such as *blastocyst*, *pre-embryo*, and *excess embryos*, which are either imported from scientific jargon into everyday language, or represent completely new coinages. One such term, whose function, though, is not to refer to the *donor entity*, but to mark the newly proposed entrance boundary of life, is the lexeme *nidation*. The explicit

arguments introducing this lexeme as well as the rest of this new terminology, which also contribute to the overall purpose of supporting the biotechnological construal, were analyzed in the main section.

To conclude, the discourse data analyzed provide ample linguistic evidence in favour of the hypothesis that LIFE has become a contested concept in the public discourse of Western societies such as the United States or Germany. It was the political debate about embryonic stem cell research in the U.S. and in Germany in the years from 2000 to 2002 which supplied the 'battleground' for a denotational boundary dispute about the entrance boundary of LIFE. In the English as well as in the German discourse, this conceptual contest was mainly fought between adherents to the conservative model, and proponents of the biotechnological construal – two cognitive models competing to take the lead in determining the contested concept of LIFE.

In these and many more cases of contested concepts, what is at issue is the dislocating or relocating of denotational boundaries (Jäkel in prep.). From a linguistic perspective, examples like these do not only provide a brilliant chance to witness the natural diachronic change of field patterns happening 'in quick motion'. They may also give us a real insight into the complex and dynamic interplay between language and ideology. Thus, with the cognitive semantic field analysis of contested concepts, I hope to provide another useful tool for Critical Discourse Analysis, or for what might become a Critical Cognitive Linguistics.[5]

Notes

1. This approach (Jäkel in prep.) is rooted in the tradition of structural field semantics, and based on the work of linguists such as Trier (1931), Whorf (1956), Lehrer (1974), Lyons (1977), and Lehrer and Kittay (1992), which it tries to combine with modern cognitive semantics (cf. Geeraerts 2006). For this combination of structural and cognitive semantics, see also Cruse (1986, 2000), Lyons (1995), Saeed (1997), Lipka (2002).
2. As this investigation is concerned with human life only, the following discussion will completely disregard animal life.
3. A fifth construal, the "Jewish Model", will be introduced later in the main section (3.3), as it is of only marginal importance for the analysis and discussion of discourse data.
4. The English paraphrases given with all linguistic examples from German are my translation.

5. Cognitive linguistic contributions pointing in that direction include publications by Brigitte Nerlich et al. (Nerlich, Dingwall and Clarke 2002; Nerlich, Hamilton and Rowe 2002; Wallis and Nerlich 2005) and Alan Partington (2003) as well as George Lakoff's recent work on *framing* (Lakoff 2004, 2006, 2007, 2008).

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Breakthroughs and *disasters*: The politics and ethics of metaphor use in the media

Brigitte Nerlich

1.   Introduction

Over the last five years or so a new field of sociology has emerged called "the sociology of expectations" (Brown et al. 2006). At the same time a new field of cognitive linguistics, linked to critical metaphor analysis (Charteris-Black 2004), has developed which studies the function of *discourse metaphors* in real world contexts (see Zinken, Hellsten, and Nerlich 2008; Zinken 2007; Musolff and Zinken 2009). In this chapter I would like to use insights from both emergent fields, the sociology of expectations and the study of discourse metaphors, to explore the function of metaphors in the creation of positive and negative expectations in science and healthcare and the implications this has for science and society. One of the proponents of the sociology of expectations, Arie Rip, has pointed out that:

> Expectations are part and parcel of regular sociology, but we will argue that they deserve special attention. Expectations circulate, get articulated, are available as part of a repertoire and become embodied. As such they are an important feature of modern societies. They go deeper than either simple role expectations or cognitive estimates of future happenings. The future is made co-present through expectations (without losing its prospective, unachieved character) and guides present action and interaction through their sociality and materiality. (Rip n.d.)

The sociology of expectations has mainly studied the creation of positive expectations (early promises and hopes) in biotechnology and nanotechnology. More recently, I have begun to study the impact of negative expectations (early warnings and fears) regarding pandemic influenza, using insights from pragmatics and metaphor analysis (Nerlich and Halliday 2007).

Both positive and negative expectations should be studied in the sociology of expectations as well as in cognitive linguistics, as expectations are mainly created and circulated through the media using specific frames, key words and metaphors. Such metaphors can be conceptual metaphors which are used almost unconsciously and go almost unnoticed (Lakoff and John-

son 1980), such as BREAKTHROUGH or RACE in the context of positive expectations, or DISASTER, CATASTROPHE, or APOCALYPSE with regard to negative expectations. There are however other metaphors which are used in order to be noticed and which provoke debate and discussion. These are discourse metaphors such as POST-ANTIBIOTIC APOCALYPSE, which I will study in this chapter and contrast with the use of conceptual metaphors. Both types of metaphors are performative, that is, they mobilize the future into the present and are linked to a whole range of discursive forms such as narrative scripts (Deuten and Rip 2000; Mulkay 1993) and mutually binding promises and agendas (van Lente 1993).

Those who study positive expectations also investigate hype/hope-disillusionment cycles and what they tell us about the social, cultural and material context of future orientation, and they have asked whether it is possible to formulate a more constructive approach to such expectations. I have been focusing instead on hype/panic-cynicism cycles with regard to negative expectations and would like to know whether it is possible to formulate a more constructive approach to such expectations and a more constructive approach to the 'early warnings' that help to create them. Is there a better way than creating hyped-up promises and hyped-up warnings to orient future behaviour? Is it ethical to hype up promises or warnings about future developments? What are the political motivations behind such linguistic activities and what are the consequences? These are questions at the heart of language-science-society interactions.

In this chapter I want to explore the scientific, social and ethical implications of conceptual metaphors, on the one hand, and discourse metaphors, on the other, in the context of creating expectations about science. In order to do so I will use two case studies. I will examine race and breakthrough metaphors in the science and media discourse about therapeutic cloning and contrast this with the use of a specific discourse metaphor in media discourse about antibiotic resistance and the rise in so-called *superbugs*, such as MRSA (Methicillin resistant Staphylococcus Aureus).

On 27 March 2007 Sheila Jasanoff, the Harvard professor of Science and Technology Studies, gave a paper entitled "Performing democracy: experts, citizens and the public trust" (C. R. Parekh Lecture, Centre for the Study of Democracy, University of Westminster) in which she noted that: "To maintain trust between experts and publics requires us to think of democracy as a performance whose scripts call for constant and critical reflection and oversight." As part of such a reflection a critical analysis of scripts and their performance in the media is needed. Media analysis cou-

pled with a type of metaphor analysis that reflects on the performative and discursive power of metaphors could provide a first step towards such a critical reflection.

2. Conceptual framework: Frames, conceptual metaphors and discourse metaphors

This study uses insights from metaphor analysis, frame analysis and the sociology of expectations to explore some dominant scripts used in the media to discuss issues of science, technology and health. Expectations are created through framing an issue as 'something else', which is itself a type of metaphorical process. Frames are thought organizers, devices for packaging complex issues in persuasive ways by focusing on certain interpretations over others. According to Iyengar (1987), frames for a given story are seldom conscientiously chosen but represent instead the effort of the journalist or sponsor to convey a story in a direct and meaningful way. As such, news frames are frequently drawn from, and reflective of, shared cultural narratives and myths and resonate with the larger social themes to which journalists tend to be acutely sensitive (see Iyengar 1987: 163). A frame suggests what is relevant about an issue, and what should be ignored. The *genome*, for example, has been framed positively as A GOLD MINE, A KEY TO UNRAVELLING LIFE'S MYSTERIES, A WONDROUS MAP and so on (see Nerlich and Kidd 2005). Frames emphasize certain attributions about the causes and consequences of an issue, and they also tell us who or what is responsible. "Frames are principles of selection, emphasis and presentation composed of little tacit theories about what exists, what happens, and what matters" (Gitlin 1980: 6). In this sense they are quite similar to metaphors and metaphors are probably amongst the most effective framing devices. Other framing devices are comparisons to historical exemplars such as the Holocaust, Nazi eugenics or past pandemics and plagues; stock literary characters, such as Frankenstein; stock literary titles, such as *Brave New World*; stock religious or mythical allusions, such as the apocalypse, Pandora's Box and so on. Like conceptual metaphors, frames do not seem to change greatly over time and across cultures (see Nerlich and Hellsten 2004).

It should be stressed however that frames are not only used by journalists; they can also be used strategically by advocates to define issues in ways that favour their preferred outcomes and to mobilize their constituents

to take action (e.g. *Frankenfood*); by scientists to communicate the relevance of their findings and invite further funding (stem cells as master cells or the elixir of life; genes as building blocks of life) and so on. But frames are also used by the 'average citizens', as they allow them to make up their minds about a topic with little or no other information, and to talk about their opinions with others (see Entman 1993).

Frames evoke and are linked to shared storylines. "The point of the story-line approach is that by uttering a specific element one effectively reinvokes the story-line as a whole. It thus essentially works as a metaphor" (Hajer 1995: 56). Metaphors, storylines, narratives and frames are intimately linked. Metaphors, stories and narratives are however not just descriptive, they do not merely represent facts or fictions. They have a performative force. As Bono (2005: 137) has pointed out, metaphors are "invitations to action" and narratives are "users' manuals" for putting metaphors into action, for learning to work with and through metaphors. Similarly Brown (2003: 3) has argued that

> [e]xpectations can be performative also in the sense that promises are performative. The phrase 'I promise X' is not just a description, it makes the person who enunciates the phrase accountable for doing X (or a version of X). […] this is how early promises and early warnings lead to reactions and sometimes to escalating arguments for and against.

"The work of metaphor", Bono argues, "is not so much to represent features of the world, as to invite us to act upon the world as if it were configured in a specific way like that of some already known entity or process" (Bono 2001: 227). Metaphors can be used by experts and the media to shape visions of the past and/or the future, to try to affect our social and political actions in the present. They can also be used to orientate users (whether as institutions, groups or individuals) to particular possibilities for action and have an effect on material investment (Brown 2003), be it using positive expectations to get funding for scientific research, persuade participants to donate oocytes and so on, or be it using negative expectations to persuade funding agencies to increase support for new lines of inquiry, persuade governments to stockpile Tamiflu, change antibiotic prescription behaviour and so on.

Framing therefore plays a major role in the exertion of political power as it encapsulates the identity of actors or of interests that compete to dominate the text. In this context, it might be useful to distinguish between frames which are used tacitly and which go almost unnoticed and frames which are chosen more carefully and, in a sense, pragmatically, strategi-

cally and politically. This difference maps onto a difference in metaphors recently discussed in cognitive linguistics.

In recent years some researchers have argued that there is a difference between so-called conceptual metaphors and what they call discourse metaphors (Zinken, Hellsten, and Nerlich 2008). Unlike conceptual metaphors, which are deemed to be universal and used tacitly, discourse metaphors are relatively stable metaphorical projections that function as key framing devices within a particular discourse over a certain period of time (Zinken 2007). They are embedded in discourse formations and are constitutive of world views, of society, of how things work. They are linked to shared narratives, metaphor scenarios (Musolff 2006) and "licensing stories" (Eubanks 1999: 419), which reflect people's political, philosophical, social and personal commitments. They might be taken up, mobilized, negotiated, elaborated, rejected, reformulated, redesigned, and criticized in order to achieve specific goals (Nerlich 2005). Hence, they have been studied as instances of a politics of metaphor (Hellsten 2002) in action. Insights from frame analysis and metaphor analysis will here be used to explore the political and ethical implications of metaphor use in the process of creating expectations about science and technology.

The first part of the following chapter examines the use of breakthrough and race metaphors in reporting on advances in therapeutic cloning and its implications for health care and the breakdown of these metaphors when fraud was discovered in reporting on such advances. The second part analyses how a scientist used a specific disaster or catastrophe metaphor (THE POST-ANTIBIOTIC APOCALYPSE) pragmatically and discursively to call attention to a possible breakdown of a medical technology, namely antibiotics, and the threat this poses to human health. The first case study deals with the political use of conceptual metaphors, the second case study deals with the political use of a specific discourse metaphor. The two case studies focus on media discourses between 2005 and 2007.

3. The politics and ethics of conceptual metaphors: The case of Woo-Suk Hwang

In this part of the chapter I want to explore the political and ethical implications of the use of two conceptual metaphors: SCIENCE IS A RACE and SCIENTIFIC ACHIEVEMENTS ARE BREAKTHROUGHS. I will do this by looking more closely at the rise and fall of one scientist, Woo Suk Hwang, whose

scientific claims regarding embryonic stem cells and therapeutic cloning were reported first as breakthroughs but later revealed to have been fraudulent.

Embryonic stem cells are

> the master cells that can be extracted from early embryos, are naturally destined to become all of the cells of the body, a property called pluripotency […] Exploiting a method called nuclear transfer [used in 'cloning'; BN], which has worked in the mouse but has yet to succeed in humans, scientists hope to create customized patient-specific embryonic stem cells by inserting a patient's skin cells into the milieu of an egg whose own DNA has been removed. (Herold 2007: xiv)

This is called therapeutic cloning or somatic cell nuclear transfer as opposed to reproductive cloning which produced, for example, Dolly the sheep.

Since about 2001 embryonic stem cells have been in the news and have provoked controversy around the world. Much hope is pinned on their therapeutic use to alleviate conditions such as Alzheimer's or spinal cord injuries; much alarm surrounds their use as it might offend various ethical, moral or religious standards.

> So the expectations on the part of doctors and patients, and the government and commercial pressures on scientists working in this field are enormous. The pressure from the South Korean government – determined to be right at the forefront of technological and scientific innovation – for some dramatic pay-off, was extreme. (Jardine 2006).

In February 2004, Hwang and his team of researchers at the National University of Seoul in South Korea, announced that they had successfully created an embryonic stem cell line using somatic cell nuclear transfer, and they published their paper in the 12 March issue of *Science*. This fulfilled the expectations created by supporters of therapeutic cloning research and put Hwang "at the forefront" of international research. They announced in May 2005 that they had created eleven new lines of cloned human embryonic stem cells, including, for the first time, two that were genetically matched to patients with a disease. This work, published in the 17 June issue of *Science*, was instantly hailed as a breakthrough in biotechnology. On 3 August 2005, Hwang announced that his team of researchers had become the first to successfully clone a dog, which meant being not only the first to succeed in creating embryonic stem cell lines but also being the first in cloning a dog. The dog, an Afghan Hound, was named Snuppy, short for

Seoul National University Puppy, or as *The Guardian* reported (04/08/05): "The breakthrough ends a seven-year worldwide race to replicate a dog". In October 2005 the World Stem Cell Hub opened in Seoul. The author of the recent book *Stem Cell Wars*, Eve Herold, was there at the very moment when Hwang had reached what she called the "apex" of fame and put Seoul at the "epicentre" of stem cell research:

> I was touched by the unadulterated hope and optimism that was so palpable at this event. Koreans regarded the opening of their international center of collaboration as a landmark event for their country. Dr. Hwang's work, and the support of the hub, opened up a whole new chapter in their history, placing South Koreans at the proud center of world events. After a brief introduction by the director of the newly created Seoul Central Stem Cell Bank, Dr Jung-Gi Im, a video tribute placing Dr. Hwang's discoveries at the apex of modern scientific achievements began. It featured the first flights of the Wright brothers, Alexander Fleming's discovery of penicillin, and Einstein's discovery of the laws of relativity, followed by the Koreans' milestones in therapeutic cloning. It described the World Stem Cell Hub as the "epicentre of world stem cell research". Images of Christopher Reeve and Mohammad Ali were followed by a glorious finale with smiling, happy children, blue skies, and messages of hope. (Herold 2007: 166)

As Herold points out, no scientist in recent history had enjoyed such star status and star treatment, and at no point in history had expectations for treatments using embryonic stem cells been so high. By carefully framing, staging and selling his research Hwang had achieved celebrity status and raised expectations. This framing included the use of metaphors and images around RACE, ASCENT and BREAKTHROUGH.

But soon afterwards, in November 2005, Gerald Schatten, a University of Pittsburgh researcher who had worked with Hwang for two years, announced that he had ceased his collaboration with Hwang because he had concerns regarding oocyte donations in Hwang's research reported in 2004. There were rumours that some women had been coerced into donating eggs. On 29 December 2005 Seoul National University determined that all eleven of Hwang's stem cell lines were fabricated. On 10 January 2006 the university announced that Hwang's 2004 and 2005 papers in *Science* were both fabricated. Following the confirmation of scientific misconduct, on 11 January 2006, *Science* retracted both of Hwang's papers on unconditional terms. Hwang was sacked from the university in March and in May charged with fraud and embezzlement. On 26 October 2009, Hwang was finally convicted of embezzling research funds and of illegally buying human eggs.

This rise and fall was remarkable but it was also alarming as it exposed changes in the culture of science, science communication and dissemination which had been happening for some time but had gone relatively unnoticed. It also undermined the prototypical image of scientists as people of integrity searching for the 'truth'. Although scientists have never been completely above tampering with evidence in order to claim an important scientific 'breakthrough', the temptation to do so has increased enormously over the last 50 years or so, as the relationship between science, politics and the public has become more and more entangled. As early as 1995 Dorothy Nelkin wrote the book *Selling Science: How the Press Covers Science and Technology* (1995). She demonstrated that science writers frequently act as promoters of science and technology, depicting scientists as miracle workers who are constantly achieving 'breakthroughs'. After the Hwang scandal the sociologist Peter Weingart wrote an article entitled "Der Fall Hwang Woo Suk – Wird Betrug in der Wissenschaft 'normal'?" [The case of Hwang Woo Suk – Is fraud becoming 'normal' in science?] (Weingart 2006), and more recently still there have been speculations about a rise in research misconduct at the World Conference on Research Integrity (Radnofsky 2007).

This change in the culture of science was signalled by the emergence of new metaphors. In his research in the field of the sociology of expectations Nik Brown observed that framing the story of scientific achievement was different before and after the 1950s. Before the 1950s science was mostly framed as a journey or voyage of discovery (SCIENCE IS A JOURNEY), a relatively gentle and speculative pursuit, exemplified for instance by the factual *Voyage of the Beagle* or the fictional *Journey to the Centre of the Earth* (although there are exceptions, as for example, the race for absolute zero, the 'holy grail' of temperature physics, which took place in the 19th century). Gradually, over the last century, this journey of discovery has turned into a race and a race dependent on breakthroughs. This change in conceptualizing science accelerated at the time of the cold war when the arms race dominated political thinking. Although the term *breakthrough* had been in military usage since the First World War, meaning 'an advance penetrating a defensive line', it was only applied to technology and science in 1958 with relation to the H-bomb and as meaning 'a significant advance in knowledge, achievement, etc.; a development or discovery that removes an obstacle to progress.' The *Oxford English Dictionary* quotes from the 11 September 1958 edition of the *Listener*: "The technological break-through which allowed both the United States and the U.S.S.R. to produce H-bombs within a year of each other" (*Oxford English Dictionary online*). In the

context of the cold war and the nuclear arms race, the gentle metaphor of SCIENCE AS A JOURNEY was replaced by the more aggressive metaphor of A RACE TO ACHIEVE BREAKTHROUGHS. Science became more directly goal oriented. In this process the conceptual metaphor SCIENTIFIC ACHIEVE-MENTS ARE BREAKTHROUGHS became probably the "most powerfully future oriented metaphor within the current disclosure repertoire of science and science journalism" (Brown 2000: 89). Nowadays, "[s]cientific institutions and science correspondents routinely evoke the breakthrough [race] motif when seeking to attract the interest of wider audiences. In so doing both lend credence to a culture which they may subsequently criticize when claims are revoked or judged to be hype" (Brown 2000: 106). As Chekar and Kitzinger have pointed out in their recent article on Woo Suk Hwang: "Scientific breakthroughs are regularly spoken about in the language of either war or sport, whereby the 'win' is construed as not just against disease, but also as a victory in international competition" (Chekar and Kitzinger 2007: 303).

In a sense science and the media were carried away by certain metaphors indicating rapid scientific progress or advance. SCIENCE AS A JOURNEY was replaced by SCIENCE AS A RACE, SCIENCE AS A COMPETITION, A CONTEST and, indeed, as the title of the book *Stem Cell Wars* indicates, AS A WAR or BATTLE. Science has become increasingly political and politicized, but such increases in political gain have been accompanied by increases in ethical risks (increased pressure to get results at whatever costs, including coercion of subjects, falsification of data, fraud etc. are but some examples). In contrast to the JOURNEY frame, many frame components of RACE carry ethical risks, as a race involves competitors, a goal, speed, pace, time, a place, intensity, a prize, and most importantly winners and losers.

As early as 21 May 2005 *The Guardian* noted that in the race for success in therapeutic cloning "progress [is] so rapid that it threatens to overwhelm the social constraints that govern such research". In the case of the therapeutic cloning race, the competitors were the University of Seoul and the University of Newcastle in the UK. As reported for example in *The Guardian* on 20 May 2005: "That team, lead by Woo Suk Hwang at Seoul University, today announced going one step further than the Newcastle researchers by creating stem cells tailored to patients with specific medical conditions." The race took place between February 2004 and December 2005. The goal was the derivation of stem cell lines from cloned human embryos and the prize was scientific glory. As in all races there was pressure to win the race – in the case of Hwang the pressure from the state was

in fact intense, based on "Seoul's traditional meritocratic pressure thanks to its no-time-to-lose drive for success, amidst rising pride" (Cheow 2006). As one commentator observed on 11 January 2006, when the race was over: "There was this desire to move ahead rapidly, and Hwang was supposed to be the person to pull this cart" (Gottweis, quoted in Sang-Hun 2006).

How were this race and the final disgrace of Hwang conceptualized in the UK national newspapers? To answer this question Lexis Nexis Professional, a searchable archive of content from newspapers, magazines, legal documents, etc., was used to search the key word *Woo Suk Hwang* in UK national newspapers published between 1 February 2004 and 11 January 2005. 80 articles were collected, examined and relevant metaphors were extracted. Until the middle of December 2005, a cluster of forward looking metaphors or ASCENT metaphors based on the image schema of MOVING FORWARD ALONG A PATH were used, whereas metaphors used from the middle of December 2005 until 12 January 2006 (when *Science* had retracted Hwang's papers) clustered around the image schema of MOVING BACKWARDS ALONG A PATH or DESCENDING A PATH. Both metaphors or dominant frames are related to what Johnson (1987) called image schema, in this case the path image schema, an image schema being "a condensed redescription of perceptual experience for the purpose of mapping spatial structure onto conceptual structure" (Oakley 2007: 215).

Components of the ascent frame are a path leading upwards, obstacles or hurdles on the path, milestones or landmarks along the path, the path leading to a (new) frontier, the manner something moves along the path (speed, type of movement etc.), and, if two entities move along the same path, the way they interact (race, one leading, going ahead, another falling behind etc., the winner breaking through or leaping over the crossing line); the nature of the path and how it is constructed (to pave the way) etc. As one can see on Figure 1, metaphors used by UK broadsheets exploited these aspects of the ascent frame while Hwang's fame was growing. Once Hwang had 'fallen', metaphors based on the descent frame were used, but they were less varied. Although the corpus I used was small and the numbers of metaphoric expressions that I counted and that are related to the ascent and descent frame are also quite small, one can see that after January 2006, metaphors relating to a forward movement are replaced by those based on a backward one, and the endpoint of the path, which had been conceptualized as reaching a frontier, is replaced by a blind alley (cf. Figure 2). Both movements along paths together chart a pathway of success and failure in modern science, a pendulum movement all too familiar to scientists.
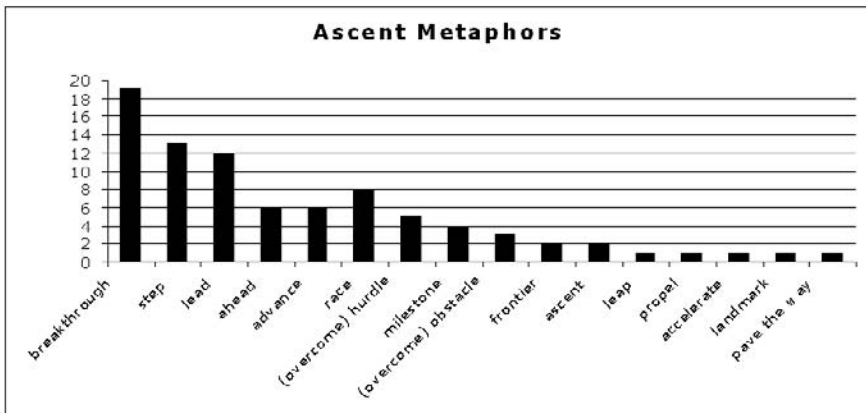
Figure 1. The metaphor frame of ASCENT (*race* and *breakthrough*).

Some examples of metaphorical expressions based on the ascent frame:

(1)   *The breakthrough **marked a critical step** towards a new era of designer medicine.* (*The Times*, 21/02/05)
(2)   *Cloning breakthrough **opens up new fronts** in the battle against disease.* (*The Daily Telegraph*, 20/05/05)
(3)   *Cloning breakthrough **opens the door** to new treatments – and to a fierce ethical debate.* (*The Independent*, 13/02/04)

Most breakthrough metaphors were used in commentaries by journalists. The original press release from February 2004 speaks in slightly less hyped terms of this research opening new doors for treatment. Here the endpoint of the path, initially conceived of a *final* or *new frontier* has been replaced by a more ordinary *door*.

Such early expectations were dashed on December 2005 when many journalists had to reverse gear, so to speak, and future patients had to give up their early hopes for miracle treatments. The BREAKTHROUGH metaphor was still used in 2006 but always with provisos, as in this extract from an *Observer* article: "Of course, we'll also be watching the development of stem-cell research after the trials and tribulations of Woo Suk Hwang. New breakthroughs may have been put back for years."
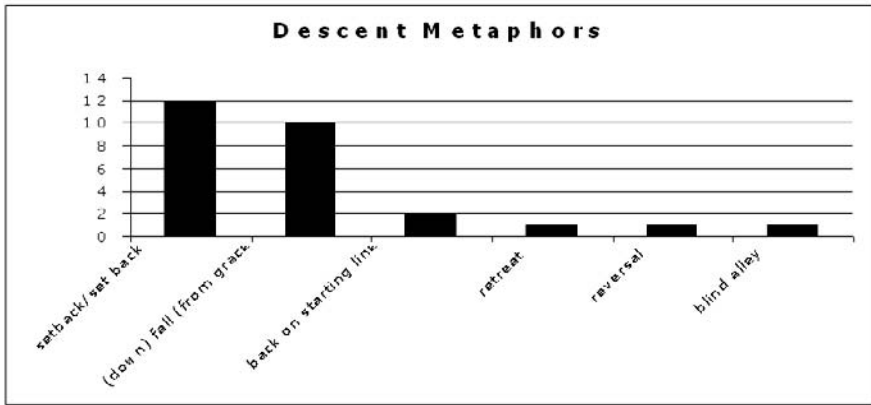
Figure 2. The metaphor frame of DESCENT (*reversal* and *fall*).

Overall, Hwang's pathway of rise and fall followed the narrative of the Greek myth of Icarus, a metaphor for the dangers of human hubris. The flight of hubris had to be abandoned and ordinary scientific work and drudgery had to begin again. As one commentator wrote a year later:

> The Korean tragedy dealt a painful blow to stem cell researchers the world over. On top of everything, scientists had been led to believe that the technical hurdles of human therapeutic cloning had been crossed by the Koreans. Now it was back to the blackboard for those who had hoped to build on Dr. Hwang's accomplishments" (Herold 2007: 198).

The narrative of Hwang's rise and fall shattered the myth of science as steady and even spectacular progress and steady advance. It also exploded other myths about peer review and publishing practices in top scientific journals.

> Hwang's disgrace has sent aftershocks across the world. Commentators are questioning the validity of scientific peer review and floating proposals for its reform. Journal editors are being accused of sacrificing judicious assessment of manuscripts in the quest for the next big story. The pace and competitiveness of biomedical research are portrayed as increasingly out of control, driving scientists toward questionable practices and even fraud. (Gottweis and Triendl 2006)

The events surrounding Hwang showed that research communities are increasingly implicated in *hyping* up research findings, something that Lord Winston had already hinted at two months before the scandal broke – but

hyping up should not be confused with *fraud* which is something quite different:

> The potential benefits of embryonic stem cell research have probably been oversold to the public, fertility expert Lord Winston says. He fears a backlash if science fails to deliver on some of the 'hype' around the cells – as he believes may happen. He says the notion that a host of cures for serious, degenerative disorders are just around the corner is fanciful. (Amos 2005)

The implications for science communication of such a state of affairs have recently been explored by Rick Borchelt. He fears that a narrative of hubris perpetuates the view that science is a linear process of steps and breakthroughs, with no account given of the trials and errors that occur along the way (Borchelt 2006). This in turn creates unrealistic expectations that science always gets it right and when the inevitable errors occur, confidence in scientific enterprise is eroded, eventually cultivating a cynical public. By contrast, framing science as a technology of humility would highlight trial and error, explain the significance of failure, and sketch out the episodic and non-linear progress of scientific endeavour. This type of discourse would favour process over product and journey over race metaphors.

Why is this important and what has this to do with metaphor analysis? Metaphors and images create visions and expectations. Visions and expectations set patterns for action. Such actions can be financial investment and support, but also emotional/embodied investment and support – as, in the case of Hwang, the support Hwang continued to receive from women even after his fall and their willingness to provide him with eggs for research. The (ethical) question is: Should these actions and expectations be generated by a discourse of hype and hubris or a discourse of humility? Cognitive linguists and metaphor analysts should work together with science writers to highlight the politics and practice of metaphorical and discursive framing, to foster critical reflection on science writing and science journalism, and to highlight the social relevance of metaphor research.

4.   The politics and ethics of discourse metaphors: The case of the POST-ANTIBIOTIC APOCALYPSE

In the previous section I studied the positive hype/early promises surrounding embryonic stem cells and therapeutic cloning. In this section I will examine the negative hype/early warnings surrounding the rise of antibiotic resistance and the emergence of so-called *superbugs*.

In 1998, Peter Weingart had observed with relation to climate change that exaggeration and discursive overbidding were tools used by scientists in the race to gain public support and public funding (and this is, again, quite different from *fraud*). He speculated that

> [w]hat appears here as a recent and unique development can be demon-
> strated to be a recurrent pattern. In policy-relevant areas the emergence of
> new research fields follows the path of climate change research: In the be-
> ginning is the claim of an impending danger if not catastrophe. A small
> group of scientists (from different disciplines) who proclaims this danger
> also provides suggestions for a solution. The promise to be able to avert the
> threat comes with the authority of scientific expertise in a brand new re-
> search area and is tied to the condition of needed financial support. (Wein-
> gart 1998: 878)

I will attempt to show that the discourse signalling the danger or catastro-phe related to the emergence of antibiotic resistance and of superbugs seems to follow this template, script or frame. Using the tools of discourse metaphor analysis, I will also try to explain why such discursive overbid-ding has advantages and disadvantages.

In the 1960s "it seemed as if the war against bacterial infections was over. In fact by 1967 things looked so promising that the US Surgeon General confidently declared: 'It's time to close the book on infectious disease'" (James 2005). However, the rise in antibiotic resistance led to the emergence of so-called superbugs, and the 'war' against microbes, which many thought had been won, had to start all over again.

Bacteria and other micro-organisms that cause infections are remarkably resilient and can develop ways to survive drugs meant to kill or weaken them. This antibiotic resistance, also known as *antimicrobial resistance* or *drug resistance,* is due largely to the increasing use of antibiotics. Antibi-otic resistance emerged almost simultaneously with the use of antibiotics, such as penicillin, after the Second World War, but only became a real problem during the 1990s. Nowadays, a vision of a disease-free utopia has given way to a vision of a dystopian future where bacteria reign supreme, unchecked and uncheckable by antibiotics, because the available antibiotics develop resistance and new antibiotics are not being developed.

Early warnings about the dangers posed by a rise in antimicrobial resis-tance and a concomitant rise in superbugs had been given from the mid-1990s onwards, mainly in popular science books and articles in medical journals such as the *British Medical Journal* and *The Lancet*. Some of these warnings were framed by reference to plague, some by reference to *Arma-*

gaddon and the *apocalypse*. In the spring of 2005, Richard James, Professor of Microbiology at the University of Nottingham, entered the apocalyptic battle ground with an article for the University of Nottingham's *Vision* magazine entitled "Battling bacteria", in which he talked for the first time of a "*post-antibiotic* apocalypse" (James 2005) – a novel discourse metaphor intended to change the discourse and the practices surrounding the use of antibiotics and the treatment of superbugs. On 7 January 2006 *The Guardian* published a lengthy interview with James entitled "War on Terror" in which James outlined "his vision of an apocalypse", followed a month later, on 1 February, by an article in the *Nottingham Evening Post* entitled "Our future at mercy of deadly superbugs". As in 2005, competition and war metaphors abound. James was, as he pointed out in this article, "on the warpath". His aim, it seems, was to change policy makers' perceptions of how to deal with antibiotic resistance and superbugs and to promote new research into this issue. To achieve this aim he chose a powerful discourse metaphor which framed the issue of antibiotic resistance in a very negative 'end of the world' way but also employed a number of conceptual metaphors linked to the war scenario.

On 5 January 2007, the University of Nottingham opened a new Centre for Healthcare Associated Infections (of which I am a member) and issued a press release that quotes James as saying: "Quite frankly, the impending crisis on the horizon can be called the 'post-antibiotic apocalypse'." This time, in the context of the opening of a centre, framed by a launch conference and a press conference, the phrase reverberated through the regional, national and international press.

In order to study the discourse of the apocalypse relating to antibiotic resistance and superbugs 25 articles were examined. Using Lexis Nexis Professional (UK) a first batch of articles were found using *apocalypse* and *antibiotic* as key words. Articles using these keywords appeared between 1996 and 2007, with the compound *antibiotic apocalypse* coming onto the scene in 2005; some articles had to be discarded as they dealt with topics unrelated to the focus of this article. Another batch of articles was retrieved using a Lexis Nexis Professional version that gives access to articles published in English speaking news outlets world-wide. This time the keywords used were *Richard James* and *Nottingham*, so as to capture the media output after the opening of the Centre for Healthcare Associated Infections, between January 5 and February 12. Most of the articles studied are based on interviews with Professor Richard James, with additional information gleaned from Dr Martin Westwell (Oxford), Professor Paul Wil-

liams (Nottingham) and Dr Pete Greenberg (Washington). Like many others, these three microbiologists used the language of war extensively, but only James used the phrase *post-antibiotic apocalypse*, a deliberate discursive move used to attract attention to a situation that needed urgent political attention and action. While talking about this apocalyptic scenario, framed by his well-chosen discourse metaphor, James also used conceptual metaphors which are commonplace in microbiological and infectious disease discourse, namely the conceptual metaphor FIGHTING DISEASES IS WAR – and, as he pointed out in an article for the University of Nottingham's *Exchange Magazine*, he used these metaphors quite unconsciously and tacitly (see James 2007a; Nerlich 2009. However, the combination of the consciously chosen discourse metaphor and the unconsciously used war metaphors was a potent mix. Let us now take a closer look at the "language of war and apocalypse", first its rhetorical form, then its function, then its implications.

The following metaphors of war were used between 2005 and 2007 in relation to the announcement of a *post-antibiotic apocalypse*:

— DEALING WITH HEALTHCARE ASSOCIATED INFECTIONS IS A WAR:
   fight against healthcare associated infections
   combat superbugs
   fighting the "impending crisis" of bugs like MRSA and clostridium difficile
   centre dedicated to the fight against spread of infections
   battle against MRSA "apocalypse"
   spearhead the fight against killer superbugs
   win battle against bacteria
   fight back
   defeat MRSA and other superbugs
   to fight killer superbugs
   fighting a loosing battle

— DEALING WITH BACTERIA IS A RACE:
   race between human beings and their microbial foes
   racing to find new ways to fight vancomycin-resistant MRSA
   arms race
   struggle to keep up

— BACTERIA ARE AGENTS IN A WAR:

microbes really fight back
the battle is swinging back in favour of the bacteria
disease-causing organisms have a range of weapons
warfare where bacteria kill other bacteria using their own protein antibiotics
an army going into battle […] *needs strength in numbers and good lines of communication so that it knows when to deploy its weapons for maximum effect*
they have a mechanism for deciding how long to wait before firing their weapons
just waiting to bite
we're not fighting guerrillas taking pot shots here
this is a sophisticated army with astonishing weapons
each time we develop something new, they develop a defence for it
battle between antibiotics and bacteria
another triumph for the world of germs
amazing combination of weapons
resistance to our major-weapon antibiotics
camouflage themselves
new defences against bacterial infections
bacteria are a bit like an army going into battle
only when they've got strength in numbers do they tell their troops to start firing

—   BACTERIA ARE ENEMIES/KILLERS
single-celled foes
microbial foes
enemy
dangerous enemies at large
our deadliest enemy
incredibly sophisticated enemy
formidable enemy
under attack from a far more dangerous enemy [*than bird flu*]
new killer in our midst
killer superbugs etc.

—   SCIENTIFIC METHODS ARE WEAPONS IN A WAR
[*w*]*e work on biological warfare*
expert in biological warfare
new ways to beat the bacteria at their own game

> *winning the war is not always about killing the invader*
> *preventing bacteria from mounting an attack on the body*
> *war on terror*
> *urgently find new weapons*
> *hunting down new antibiotics*
> *wipe out*
> *the carpet-bombing approach*
> *new weapons against superbugs*
> *new strategies to fight bugs*

—   "QUORUM SENSING" **–** the ability of bacteria to communicate and coor-
     dinate behaviour via signalling molecules – IS WAR
> *break down the lines of communication*
> *intervene in the battle by blocking bacterial communication*
> *exploit this inter-bacterial warfare*
> *if we can break them up, we can kill them*
> *switch off the attack signals*
> *if bacteria start attacking the body too early when they are too few
> in number, showing their toxins to the immune system when there
> are only a few of them there, they'll get wiped out*

This is a long list of metaphors of war and competition in which bacteria
are portrayed as rather clever agents whose ingenuity scientists can all but
admire, albeit rather grudgingly. In contrast with the Hwang case, where
race metaphors framed the search for success in therapeutic cloning by two
teams of scientists, race metaphors here frame the interaction between sci-
entists and bacteria. As one can see, one way of waging this *war* or winning
this *race* is to develop new types of treatment, in this *quorum sensing* – that
is the use of antibiotics to break down bacteria's *lines of communication*.
This new scientific technique is itself based on conceptualizing bacteria as
talking to each other, but a talk that is part of a *battle*. The aim of the scien-
tists is, in a sense, to *shut up* the bacteria. As pointed out by James in an
article for the University of Nottingham's *Vision* magazine:

> It's like a battlefield communication system. When bacteria like *Staphylo-
> coccus aureus* infect the body, their toxin genes are switched off under the
> control of the quorum sensing system. Only when there are enough bacteria
> to cause a serious infection do they switch on the toxin genes and go all out
> to attack. (James 2007b).

War and competition metaphors have been a long-standing currency in medical discourse (see Hodgkin 1985; Warren 1991; Annas 1996; Larson, Wallis, and Nerlich 2005; Chiang 2007 and many more). From the times of Louis Pasteur onwards dealing with bacteria or germs has been framed in terms of waging war – what Montgomery (1996) calls "biomilitarism" in the third chapter of his book *The Scientific Voice*. From the 1940s onwards, when antibiotics became widely available, their use, too, was framed in terms of war against invading bacteria – they seemed to be a "silver" or "magic" bullet in the fight against infectious diseases. And, in a sense, they were literally a weapon in a war as the first really significant antibiotic penicillin was seen as vital to the allies winning the Second World War. For a time antibiotics were hugely successful, to such an extent that the dominant war frame that accompanied the use of antibiotics might have obscured the exploration of and investment in other technologies, such as therapies to boost or supplement the immune system or immune response.

When highlighting the diminishing powers of antibiotics in this war against bacteria the discourse metaphor of the APOCALYPSE can be useful, but it might have disadvantages too. Although it raises the profile of this problem and gets it on the public agenda, it might be counterproductive in the long term, as the apocalypse is usually seen as something that is inevitable, *the end of the world*, against which one cannot do anything. But this is not what James and others want to highlight through the use of apocalyptic discourse metaphors. They seem to stand instead in a tradition of a more secular view of the apocalypse as popularized in various films which stress the importance of human agency in averting disaster. As in a number of films from *Apocalypse Now* (1979) onwards this apocalyptic discourse focuses

> on human ingenuity in *avoiding the end rather than on the inevitability of cosmic cataclysm* [emphasis mine, BN]. In these contemporary, cinematic apocalyptic scenarios, human action (often based on stupidity or greed) directly or indirectly leads to an apocalyptic disaster; therefore, human beings supplant cosmic forces as the initiators of the apocalypse and must take the role of saving the planet from apocalyptic destruction. (Ostwald 1998)

Ingenuity is needed to develop new diagnostic technologies to improve and speed up the detection of pathogens, but political acceptance of the scale of the problem and then implementing the strategy that will significantly reduce the scale of the problem is also essential. By advocating a new, albeit dark, vision of future health care, James wants to spur politicians into action and create expectations: expectations that scientists can do something

to alleviate the problem of antibiotic resistance. This discourse is also intended to reverse older expectations, regarding for example the miracle properties of antibiotics which led to the overuse of these drugs. Creating new expectations and reversing old ones should lead to changes in behaviour and practice.

There might be a danger though that the language used, including the one salient discourse metaphor of the apocalypse and the surrounding conceptual war metaphors actually impede those desired behavioural changes. As Hulme has pointed out with relation to climate change and "catastrophe discourse":

> The language of fear and terror operates as an ever-weakening vehicle for effective communication or inducement for behavioural change. […] Framing climate change as an issue which evokes fear and personal stress becomes a self-fulfilling prophecy. By 'sexing it up' we exacerbate, through psychological amplifiers, the very risks we are trying to ward off. (Hulme 2006)

And:

> Campaigners, media and some scientists seem to be appealing to fear in order to generate a sense of urgency. If they want to engage the public […] this is unreliable at best and counter-productive at worst. […] such appeals often lead to denial, paralysis, apathy or even perverse reactive behaviour. (Hulme 2007)

The results achieved by early warnings framed in terms of fear might be similar to those achieved by early promises framed in terms of hope – if unfulfilled, they both lead to public cynicism, loss of trust and disengagement.

In conclusion, there are advantages and disadvantages in using the discourse metaphor of the POST-ANTIBIOTIC APOCALYPSE when talking about the situation regarding health care associated infections. Its alarmist tone alerts politicians to a situation that needs urgent attention, alerts funding bodies to new lines of scientific research, and might reverse ordinary people's expectations regarding *miracle drugs*. In the competition of ideas for research and political attention an apocalyptic discourse may provide a winning edge in securing resources, in this similar to the *breakthrough* discourse discussed in the first part of this chapter. However, it might also induce fears which could stifle behavioural change on the level of human populations, just as talk about breakthroughs might rise hopes which, when dashed, might change attitudes towards certain technologies or scientific

advances. The focus on fighting a *war* against bacteria in order to avert the apocalypse might also make scientists prioritize one type of approach over others, such as enlisting the help of *friendly bacteria* and developing other ways of boosting the human immune response to enable it to deal with bacteria in ways other than war and combat. Again, similar dangers exist when chasing after particular scientific breakthroughs, which might blind scientists to other avenues of research.

5. Conclusion

Announcing impending breakthroughs and warning of impending disasters are legitimate speech acts carried out by scientists and science communicators. Framing them in terms of breakthrough and disaster metaphors are useful tools in getting the message across to funding organizations, politicians and so on. However, a new culture of science funding might pervert such legitimate uses of speech acts and metaphors. To get funding in a highly competitive environment, scientists might use breakthrough and disaster discourses to enhance the visibility of their research to funders and, by using the media, to the public at large. Scientists might even engage in discursive overbidding in relation to breakthrough and disaster metaphors which can lead to a rhetorical arms race. In a recent article on the influence of the audit society on science, Lawrence has pointed to various emerging trends. I shall only highlight two in the context of this chapter. One trend is that "scientists learn to hype their work, making a story more simple and sensational by ignoring or hiding awkward results", another that "the struggle to survive in modern science has acted against modest and gentle people of all kinds" (Lawrence 2007) – aggression has become the norm. This brings us back to what I said about the replacement of the relatively 'gentle' journey metaphor by the breakthrough metaphor which now predominates scientific thinking. In such a context, the use of breakthrough and disaster metaphors is always a very difficult rhetorical and ethical balancing act, as over-hyping breakthroughs and disasters might lead to public cynicism and metaphor fatigue, especially if the announced breakthroughs and disasters don't happen (see Nerlich and Halliday 2007), that is, if positive or negative expectations are not fulfilled.

The influence of metaphors on public perception of issues relating to science and health has been studied for many years, especially with regard to cloning research, GM food, so-called *designer babies*, stem cells, and

perhaps most intensively, the human genome project. In a recent report "Realising the potential of genomic medicine", Paul Martin and Michael Morrison (2006) have urged readers to rethink what has so often been called the *genomic revolution*. They stress that stakeholders need to be realistic as to the scale of innovation in genomic medicine and the speed at which it will arrive. They should realize that biomedical innovation is a slow and incremental process as opposed to a *revolution*. Martin and Morrison claim that acknowledging this fact will help enable the general public to understand which innovations are likely to affect them in the medium term and be better placed to adopt them effectively.

Creating critical awareness of the metaphorical enactment of certain scripts or frames in the process of science communication, be it to create positive expectations or negative ones, to create hope or fear, to make promises or issue warnings, should therefore be an important task for sociologists, linguists and other scholars. Only then can 'the public' engage critically with science in society.

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Synonyme, lexical fields, and grammatical constructions. A study in usage-based cognitive semantics

Dylan Glynn

1. Introduction

Cognitive Linguistics is, by definition, a usage-based approach to language. Its model of language places usage at the very foundations of linguistic structure with a linguistic sign, the form-meaning pair, argued to become entrenched through repeated successful use. It is this entrenchment that renders symbolic gestures linguistic rather than merely incidental and represents the key to structure in language. Patterns of language usage across many individuals can be argued to be indices of shared entrenchment. When large numbers of language users possess the same or similar entrenchment, we can talk about grammar, that is, linguistic structure.

Importantly, as cognitive linguists, we believe this structure to be conceptually motivated. A basic phenomenon in conceptual structuring is salience. This concerns the conceptual prominence of perceived (or conceived) objects and their relations. Although frequency represents an important factor in determining salience, a one-to-one relationship between relative frequency and relative salience does not exist. Various cultural and perceptual factors can make relatively infrequent concepts salient and vice versa. Corpus-driven linguistics is frequency based and so inherently restricted in what it can say about conceptual salience. Nevertheless, frequency data are perfectly placed to allow us to make generalizations about patterns of usage across speech communities. Importantly, from a Cognitive Linguistics perspective, we can make the assumption that these patterns of usage represent speakers' knowledge of their language, including the conceptual structures that motivate language. In this indirect way, the inductive generalizations based on frequency permit us to make hypotheses about the conceptual structure of language. This is possible without making more theoretically tenuous claims about the relation of frequency to cognition, such as those presented in Gries (1999) and Schmid (2000).[1]

This study examines new usage-based techniques to capture semantic relations between near-synonymous words. The conceptual space encoded by a language is divided up in complex ways by lexical semantics. It follows that the study of lexical synonymy has a long tradition within Cognitive Linguistics. Moreover, the tradition dates back to some of the first corpus-driven research within the cognitive framework. Beginning with Dirven et al. (1982), Lehrer (1982), Schmid (1993), Geeraerts, Grondelaers and Bakema (1994), and Rudzka-Ostyn (1995) a strong line of empirical research developed. The current state of the art divides into the study of lexical near-synonyms (Newman and Rice 2004a, 2004b; Divjak 2006; Divjak and Gries 2006) and syntactic alternations (Gries 1999; Heylen 2005; Grondelaers et al. 2007; Speelman and Geeraerts forthc.).[2] This study advances upon previous approaches by applying a different statistical technique and by experimenting with direct semantic analysis in the annotation.

Within Cognitive Linguistics, the use of corpora and empirical methods more generally represents an important movement. Indeed, many argue that such approaches are crucial to the advancement of the field (Geeraerts 2006; Gibbs 2007; Croft 2009). The application of such methods to the study of semantics is not, however, straightforward. Corpus linguistics is essentially the analysis of large numbers of examples. A corpus linguist must examine many hundreds or even thousands of utterances before he or she can make any generalizations. It must be remembered that those generalizations are only valid to the extent that the analysis of those examples is valid. It is a common myth that corpus linguistics replaces linguistic analysis with quantitative deductions. Nothing is further from the truth. The annotation of a dataset is the laborious linguistic analysis of examples. Often computational techniques allow one to automate much of that analysis, but in the field of semantics, this is not possible. This study is concerned with precisely these quantitative usage-based methods for semantic description and so annotation is entirely made up of manual semantic analysis.

2.   BOTHER: Lexical Field, Conceptual Space, Three Near-Synonyms

2.1. Near-Synonymy and Grammatical Constructions

Synonymy, or more precisely near-synonymy, is the study of semantic relations between lexemes or constructions that possess a similar usage. In this study, we focus on three lexemes denoting the concept BOTHER; these

are *annoy*, *bother*, and *hassle*. Example (1) captures the kind of semantic relations in question. We seek to explain speaker choice between these lexemes.

(1)   *People need paypal.... Too much **hassle** over cheques, especialy when you cant be **bothered** to check your statement, god she **annnoyed** me*.[3]

Closely related lexemes have a special place in Cognitive Linguistics because their use, both in terms of their overlap and difference, can be seen as a reflection of the conceptual structures that motivate language use, and thus its structure. Although there is a certain circularity in this reasoning, we can justify approaching the question in such terms because speakers choose between linguistic forms when they speak. If we assume that speakers have knowledge of their language and culture and make their judgements based on that knowledge, this entails that their choices will reflect such knowledge. In Cognitive Linguistics, where entrenched language structure (or knowledge of language use) equates conceptual structure, by identifying the patterns of similar and distinctive usage, we chart the conceptual structure that motivates those patterns.

   The principle is the same for the study of polysemy. Indeed, the cognitive study of polysemy and near-synonymy can be seen as a re-working of the Structuralist semasiological-onomasiological distinction (see Geeraerts, Grondelaers and Bakema 1994). Seen in this light, polysemy, or semasiological variation, is the study of the different uses of a form and synonymy, or onomasiological variation, is the study of the choice between different forms. If we make generalizations about usage based on large numbers of examples, then we have a usage-based approach to conceptual structure. This, of course, must be presented with the caveat that we cannot make clear deductions about conceptual categorization and prototypicality until the relationship between ontological salience and frequency of use is better understood.

   However, it is too simplistic to speak of choices between words. Just as lexical choices are reflections of different construals, so too are their grammatical expression. The belief that different 'lexicogrammatical framings' or 'configurational structurings' result from the integration of lexical semantics and different parts of speech and morpho-syntactic forms represents a fundamental tenet of Cognitive Linguistics (Fillmore 1977: 128, Langacker 1987: 138ff, Talmy 1988: 173ff, Fillmore 2003: 250–51). When

a speaker wishes to express the concept of BOTHER, for instance, it is unlikely that the speaker decides beforehand and independently of the context that this concept will be profiled nominally or verbally, just as it is unlikely that, given a verbal choice, he or she will have a predetermined selection between encoding the concept as an intransitive or transitive event. The ability to construe events and things, of even the most concrete nature, means that it will be rare that the speaker has no choice in this matter. If we can assume that the kinds of grammatical semantics associated with grammatical class and grammatical construction are part of the semantics expressed by the speaker, then they are an integral part of the lexeme chosen. It is for this reason that we cannot consider only verbs or only nouns in the study of synonymy.

There are two points to consider here. Firstly, grammatical semantics are not predictable "additions" to the lexical semantics. Although often the grammatical profiling of a lexical concept results in regular semantic integration, that is not always the case (Glynn 2002, 2005, 2008a, forthc.). Therefore, we need to treat the interaction between the different grammatical profilings of the lexical concept as onomasiological choices, that is, part of the synonymous field. Secondly, there is growing evidence that language knowledge is largely redundant and that speakers rote-learn large amounts of profiling variation as entrenched units (Dąbrowska 2006). This means, for example, the simple and the continuous form of a verb or the nominative and instrumental case of a noun are entrenched as separate linguistic units and not 'generated by the grammar'. This is in line with Croft's (2001) arguments for a fundamental Construction Grammar approach to language structure. For these two reasons (the semantic unpredictability of lexical-grammatical composition and the fact that many of these compositions are entrenched as separate form-meanings pairs), if we are to produce a cognitively realistic grammar of lexical choice, we cannot restrict ourselves to one part of speech. Since from a Construction Grammar point of view parts of speech are merely a subtype of grammatical constructions, we will refer to this formal variation as *grammatical class* and assume there is only a theoretical divide between the formal variation of grammatical class and grammatical construction.[4]

There is one last complication that must be taken on board in a usage-based approach to synonymy. Since generalizing about the entrenched usage of many individuals is the basis of our grammar, we must account for variation between those individuals and within that usage. Therefore, Cognitive Semantic study, as a usage-based approach, must necessarily include

what is traditionally considered extralinguistic and social parameters, such as register and dialect.[5] By including this information, we achieve a truly usage-based description of usage patterns relative to a range of factors such as age, sex, region, language mode, and register.

We can conclude that the study of lexical near-synonymy is important and informative from a Cognitive Linguistic perspective since it offers us an indirect method for mapping conceptual structure via lexical choices. However, these lexical choices interact in a complex way with formal variation and the grammatical profiling of those lexical concepts. We need, therefore, to treat near-synonymy across the various grammatical classes and grammatical constructions that combine with lexical concepts. Lastly, choice between these forms is made in the social context of their use. Variation between language users and speech contexts surely affects lexical choice and so these dimensions must also be added to the equation.

We are, therefore, confronted with an inherently multidimensional object of study. We must identify patterns in usage relative to a wide range of forms and relative to a wide range of contexts. It is this multidimensional element of language structure that calls for the use of multifactorial statistical techniques to help identify usage patterns. This aspect of usage is not so readily accessible employing intuitive methods of analysis. Indeed, the multidimensional element of language structure is not identifiable when one considers the frequency of the different factors of usage individually. We need to access the simultaneous interaction of the different factors of language and to do so we need multifactorial techniques. This study demonstrates why such an approach is necessary and considers one simple technique for its application. In contrast with previous quantitative studies of synonymy, which have employed Hierarchical Cluster Analysis (Divjak 2006; Divjak and Gries 2006), we employ a technique not previously used for such purposes. This technique, Correspondence Analysis, has the advantage that it maps correlations rather than simply grouping variables. It has, however, the disadvantage that its visualizations can be difficult to interpret.

2.2. Data and Analysis

The data for this study comes from a large non-commercial corpus built from on-line personal diaries. The language is informal and in many ways similar to spoken mode. In part, this is due to the "Dear Diary" writing

tradition that involves talking 'to your diary', but it is also because these diaries 'speak back'; the LiveJournal on-line diary service used to build the corpus is interactional. This service allows the readers to respond to the "blog" entries and they regularly do. Indeed, the authors expect it and they often complain when their readers do not enter into dialogue. The corpus is made up of diary entries proper, not the dialogues, but the monologic-dialogic distinction is blurred since the writer is assuming that people will respond to his or her text. Evidence of this may be found in the countless references to certain readers and frequent switching to second person, both singular and plural. This results in quite a unique discourse style that is at once narrative and dialogic.

Despite the richness of the language in its naturalness, the corpus represents only a single text type. This is a basic and inherent limitation for this study. Corpus representativity is an important and often under-estimated issue for usage-based approaches to language. One must be careful not to draw conclusions about language based on a single corpus, but at most about the language type represented in that corpus. For our purposes, it is a serious shortcoming that, on the one hand, we consider lexemes that differ in register, but on the other, we have only one text type, which is of a most informal nature. However, one of the advantages of corpus driven research is that a study may be repeated on a second corpus and the results compared. For the current purposes, which are to demonstrate the viability and usefulness of the method, the on-line diary corpus suffices. Needless to say, further research will be necessary to confirm the results. This is true for both the need of confirmatory statistical analysis as well as verification through repeat analysis on different data.

From this corpus a relatively even number of the three lexemes were extracted, each with considerable context, totalling approximately 2,000 observations. Across these examples, the proportion of the different parts of speech, or grammatical classes, for each lexeme is maintained as it occurs in the corpus. The kind of formal variation in question is best described by way of example. The examples in (2) summarize each of the major class-construction formal variants in question and serve to introduce the kind of language that is typical of the corpus.

(2)　a.　*Saw quite a few people I knew, including the awful stalker guy who's been hassling me* [...] (Transitive)

　　　b.　*hassle me, bother me, bug me, give me a bad time, If you hassle me about my kinky hair, I'll cut it all off. hat in hand, humble, almost begging.* (Transitive Oblique)

    c. *Officer McCoy, me and him was hassling and my gun went off, hitting him somewhere in his chest.* (Intransitive)
    d. *thats the LAST time i use a non-digital camera when i'm doing serious photography because it saves all that ammoying hassle of SOD'S-BLOODY-LAW!!!!!* (Nominal Mass)
    e. *I rarely paint my nails(It can be such a hassle!)* (Nominal Count)
    f. *It's a very hassily event to do. I believe alot of reasons is it takes so much time, specially preperation.* (Adjective Attributive)
    g. *She will not take part in Saturday's 5000m race, saying she is tired and bothered* (Adjective Predicative)
    h. *However, we didn't have the time or the technical know-how to do this sort of hassling as the PDAs were ordered and the students were being briefed* (Gerund)

Almost all the forms presented here subdivide into further formal variants, with different syntactic patterns for the verbal forms, grammatical number amongst the nouns, suffixation for the adjectives, as well as two gerund forms, one that maintains a verbal argument structure and another that adopts the nominal argument structure. However, these examples represent the overall pattern of formal variation. Table 1 summarizes the relative number of occurrences of these grammatical classes and constructions.

    Altogether some 16 different basic grammatical classes and constructions are found across the three lexemes in the dataset. The eight types given in Table 1 are the most important numerically, and for the practical concern of data sparseness, the study is restricted to these forms.

Table 1. Principle Classes and Constructions of the Lexical Field BOTHER

Form	Dataset Occurrences
Count Noun *hassle*	146
Mass Noun *hassle*	217
Gerund *hassle*	40
Predicative Adjective *bother*	124
Intransitive *bother*	222
Transitive *annoy*	449
Transitive *hassle*	274
Transitive *bother*	275

The occurrences are annotated for a range of formal, semantic, and extralinguistic features. In total, some 120 features belonging to some 20 partially overlapping variables were analysed and tagged manually. At this level of onomasiological granularity and with only 2,000 occurrences, the formal variation in tense, aspect, mood, and post-predicate constituents did not reveal any informative variation in usage. There was some variation relative to person and number, but this was found to be an indirect result of other factors that we examine below. The nature of the corpus limits the range of extralinguistic variation that may be investigated. For this reason, the most insightful extralinguistic variable available for consideration is certainly the regional variation between American and British usage. This is stratified in the corpus and so straightforward to annotate. For the analysis of the synonymy *per se*, the semantic variables were the most informative and we will focus on these. Before we examine the variables in question, an important aside should be made.

Within corpus linguistics, there is a very reasonable tendency to avoid semantic feature analysis. This is for two reasons. Firstly, semantic annotation is largely manual. Such annotation entails a labour and time intensive process that limits considerably the number of observations that can be analysed and tagged. Since data sparseness is an ever-present problem in quantitative studies, this represents an inherent weakness that one wishes to avoid. Secondly, corpus linguistics, like all empirical methods, seeks to maximize objectivity. Semantic feature analysis is inherently subjective.

However, there are strong counterweights to these arguments. Although we can describe a great deal of linguistic structure limiting our research to formal phenomena, ultimately, especially within a framework such as Cognitive Linguistics, we must also apply these kinds of techniques to semantic structure. Although this will force us to work with smaller numbers of observations, it represents an inherent weakness of the method and it must be taken on board and considered when we estimate the value of the results it produces.

The same is true for the question of objectivity. We cannot pretend that any semantic analysis will be purely objective, but this should not stop us from investigating semantic structure. Quantitative studies of linguistic semantics simply repeat the kind of semantic analysis that traditional linguists use, but many hundreds of times. Although, in itself, this does not assure a higher degree of objectivity, the large number of examples does improve analytical reliability in a number of ways.

Firstly, by examining many hundreds, or thousands, of examples the researcher sees facets of usage that would not necessarily be found through

hermeneutic reflection. Although this approach cannot hope to account for all possible uses, the analysis of large numbers of found examples offers researchers an 'external', therefore objective, source for their analysis. However, this does not mean the analysis itself is more objective. Secondly, a quantitative and usage-based approach offers three means for result verification, which serve as check on the objectiveness of the analysis. In the first place, systematicity and intuitively sound patterns found by the statistical results are indications of accuracy in semantic analysis. It must be remembered that after the analysis, the results found through the statistical treatment of the data are independent of the researcher, and in this, are completely objective. When patterns of usage that match an intuitively sound perception of usage 'fall out' from the statistical analysis, we can be reasonably sure that the original semantic analysis is accurate. In a second place, confirmatory statistical techniques employ models of the data, based on the results of the analysis, to check their validity. If one may predict the usage of a word, in a given situation, to a very high level of accuracy, then we can be more sure that the original analysis is accurate. Thirdly, one may repeat the analysis on a second dataset. If the results are comparable, then once again, we can be surer of the accuracy of the semantic analysis.

We concentrate on three semantic variables, the cause of the BOTHER event, the affect upon the patient of the event, and the presence or lack of humour in the description of the event. The annotation focuses not on the word, but on the entire utterance. In many cases, a great deal of context needs to be considered to accurately ascertain the cause or affect being described by the lexeme in question. Table 2 lists the three semantic variables and the features for which they are annotated.

Table 2. Semantic Features

Cause of Event	Affect on Patient	Humour
expenditure of energy	anger	presence of humour
imposition	concern - thought	absence of humour
imposition / request	emotional pain	
request	physical pain	
interruption		
condemnation		
tease		
aesthetics		
repetition		

In order to avoid overlap between the variables, either the cause or the affect was coded, never both. Statistical techniques do not work when one has redundancy across variables. Certain cause features, for example, 'repetition' which systematically co-occurs with what would be the affect of 'boredom', are therefore a problem. Thus, for the purposes of the statistical analyses below, the cause and affect variables are treated as a single variable.

Most of the features should be self-explanatory; however several warrant a word of explanation. Three particularly important features include 'imposition', 'imposition-request', and 'request'. These features identify uses where the agent of the event imposes him or herself upon the patient or makes a request of him or her. Often, both these two features are present; when this is the case, the example is coded as 'imposition-request'. The clearest way to explain these features is by way of example. The examples in (3) represent these semantic distinctions.

(3) a. *While Valentine's Day is a nice thought, it's always such a hassle. Romance should never be an obligation, and neither should it be restricted to a single day, which are the messages Valentine's Day sends.* (Imposition)
   b. [...] *and walked up the Grays Inn Road being hassled by aggressive beggars who glared at me straight in the eyes, asking Got any change?* (Imposition request)
   c. *I can then update the page, and won't need to hassle you for the results of matches that have been postponed.* (Request)

The features 'aesthetics', 'condemnation', and 'tease' also deserve explanation. In the diary entries, speakers often experience BOTHER because someone is judging them. This is quite distinct from a situation where classmates or friends are teasing the patient and also from a situation where some inherent quality in the world displeases the patient. Again, examples (see 4) can clarify the semantic features in question as well as the kind of subtle semantic differences that the coding seeks to capture. A reasonably large amount of context was needed in order to accurately discern many of the semantic distinctions.

(4) a. *Now it's tough being an American. Everyone always gives us hassle for having a stupid president. Especially you Brits. You give us hassle for having a retard for a President. But we know he's a retard.* (Condemnation)

b. *bumping into Kath, which i always do when i'm fucked, and having lots of hugs. and not being able to pee in front of her in the toilets and hassling her because she has curly hair and i wanted to "ping" it.* (Tease)

c. *he dnt reilise tht she loves him sooo much it dnt bother her wot is on his face lol.* (Aesthetic)

It should also be stressed that 'humour' refers to the utterance in which the lexeme is used and to the intention of the speaker. The other features should be self-explanatory, their semantic distinctions being drawn in a similar manner to those described here.

3. Usage-Based Methodology. A Multifactorial Treatment of Results

3.1. Semantic Relations between Lemmata

Having completed the semantic analysis of the observations, we now have what are referred to as multiway contingency tables. These are three-way, four-way, or *n*-way tables of frequencies of co-occurring, extralinguistic, formal, and semantic features. Although one may not visualize a multiway table, the mathematical relations are simply the frequencies of co-occurrences of multiple features. These features are relative to various levels of granularity in the formal variation. For example, we can examine the correlation between the semantic variables and the three words without including the formal variation of each lemma. We can equally zoom in and examine the formal variation at a very fine-grained level, differentiating not only grammatical class and grammatical construction but also tense, mood, aspect, and so forth. The limitation is data sparseness: as we include more detail in formal variation, the numbers of occurrences for each semantic feature drops quickly. At a certain point the frequencies of occurrences become too small for us to identify meaningful generalizations in the data.

Moreover, interpreting a three-way or four-way table of frequencies of co-occurrences is not possible without using multivariate tools. Exploratory techniques exist that search through these tables looking for patterns of correlations. In other words, mathematically, some features co-occur appreciably more often than others. In our case, these are the semantic features co-occurring with the various forms of *annoy*, *bother*, and *hassle*. One such exploratory technique is Correspondence Analysis. This simple statistical technique takes the frequencies of multiway tables and converts those fre-

quencies to distances. It then conflates the multidimensional distances to a two-dimensional plane that maps the correlations between the features visually. Although this allows us to 'see' the correlations and differences between the forms and semantic features, one must be careful in reading such visualizations since, obviously, representing *n*-dimensions in a two-dimensional plane can be misleading. For this reason, the position of many of the data points relative to other data points can be misleading. Careful consultation and experience interpreting the plots is the only way to avoid misinterpretation.

    Let us begin with a Bivariate Correspondence Analysis of the semantic variables relative to the three lemmata. Figure 1 is a correspondence map of the analysis. It should be remembered that relative proximity of the data points represents relative correlation.
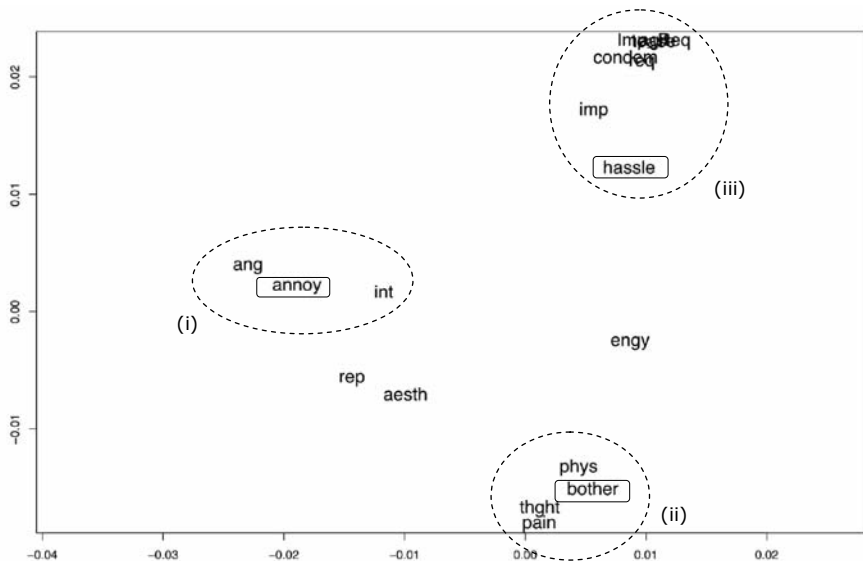
Figure 1. Correspondence Analysis BOTHER Lemmata and Cause-Affect.

Interpreting the visualizations of Correspondence Analysis can be difficult. Let us move through a description of the plot, step by step. Firstly, on the left (i), we see *annoy*, grouped with 'anger' <ang> and 'interruption' <int>. The feature 'anger' <ang> is to the left of *annoy*, which stands between it and the other lemmata. The position of this feature shows that it is highly distinctive for the usage of the lemma *annoy*. This is intuitively sound: of the three lexemes in question, *annoy* represents the point of overlap with the concept of ANGER, an interpretation corroborated by traditional diction-

aries. Also associated with the lemma *annoy* is 'interruption' <int>. However, the fact that this feature occurs to the right of the *annoy* data point, placed between the two other constructions, suggests that despite a clear association with *annoy*, this feature is shared to some extent by all three words.

Placed more or less evenly between (i) *annoy* and (ii) *bother*, we find two cause features, 'aesthetics' <aesth> and 'repetition' <rep>. We can suppose quite safely that these two features are characteristic of both these lemmata. The two features 'concern – thought' <thght> and 'emotional pain' <pain> lie just beneath the *bother* data point and so are distinctly associated with this lemma. Just as 'anger' is effectively unique to *annoy*, the semantically similar features 'emotional pain' and 'concern – thought' are effectively unique to *bother*. This is also intuitively sound. A third feature, which was rare in the data, is also highly associated with the lemma *bother*. The cause feature 'physical pain' <phys> only occurs 10 times out of almost 2,000 observations. Of these 10 occurrences, 7 are with *bother*, 2 with *hassle*, and 1 with *annoy*. It seems with such small frequencies, we cannot draw any firm conclusions. However, in the dataset, to the extent that this feature occurs, it is associated with *bother*.

One of the three most important features in terms of frequency, occurring 650 times, is that of the 'expenditure of energy' <engy>. Its data point lies in the centre of the plot, equidistant from *hassle* and *bother*, yet relatively far from *annoy*. The position of this data point strongly suggests that this feature is characteristic of *bother* and *hassle*, more than of *annoy*.

Finally, the cluster in the top right (iii) sees *hassle* associated with a large number of overlapping semantic features. One feature, 'imposition' <imp>, is distinct from this micro-cluster and considerably closer to the data point of *hassle*. This may signify a stronger correlation but needs further verification. The dense cluster just above this point consists of request <req>, 'imposition request' <imp_req>, 'condemnation' <condemn>, and 'tease' <tease>. These four semantic features seem to identify two 'meanings' of the word, the 'imposition request' and simple 'request' features being semantically similar as well as the 'tease' and 'condemnation' features clearly carving out a similar semantic space.

We could not ask for clearer results in this first correspondence analysis. Each of the three lemmata are evenly dispersed across the plot, distinctly grouped by semantic features. Certain semantic features lie between the lemmata, showing overlap in the semasiological distribution. This kind of

semantic map is a simple but powerful generalization that shows the basic differences and similarities of usage across the three synonymous words.

At this point, it is worth noting that mapping the correlations between such semantic features and various forms should be seen as an indirect means of capturing the conceptual structure. The kind of results we see here are intuitively sound and match the kind of results that one would posit using an individual's knowledge of a language. The important difference, of course, is that this technique permits repeat analysis, and is therefore easily verifiable.

We can summarize the results of the Correspondence Analysis with a box diagram. This is presented above in Figure 2. Although the box diagram adds nothing to the actual results, it is clear and more easily interpretable. Its downside is that, by rendering the correlations discrete, it does not capture the semantic continua between the correlations.
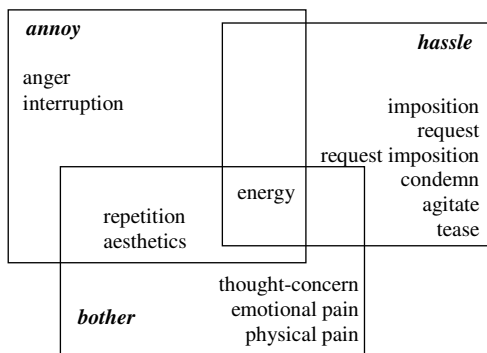
Figure 2. Box Summary BOTHER. Lemmata and Cause-Affect Features.

Despite these intuitively attractive results, even dictionaries break down lemmata into grammatical classes and this kind of coarse-grain analysis is only helpful in mapping the aggregate meaning of the three words. Any accurate semantic description must look closer than this.

3.2. Grammatical Class, Grammatical Construction, and Semantic Similarity

Let us now repeat the analysis while rendering the formal dimension more fine-grained. Figure 3 plots a Correspondence Analysis that identifies correlation between cause-affect and class-construction.
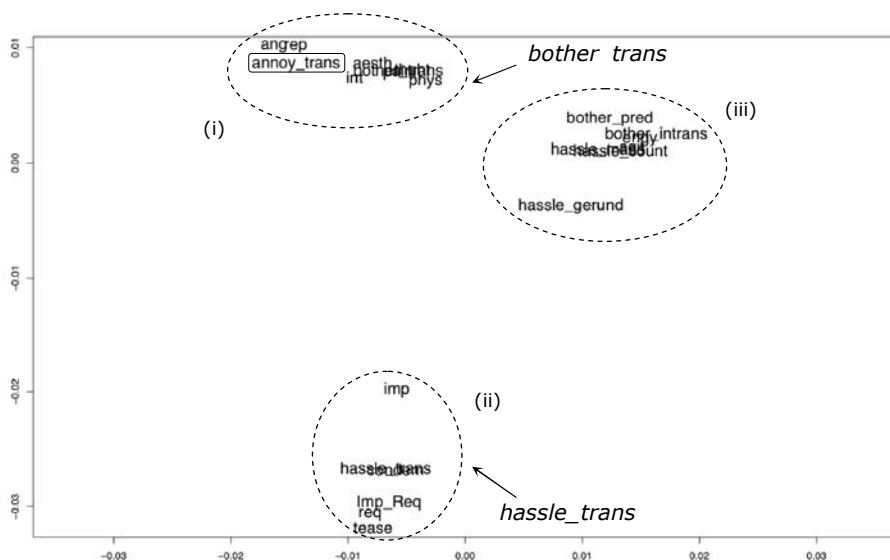
Figure 3. Correspondence Analysis of BOTHER. Class-Construction and Cause-Affect.

In direct contrast to the lemma level of analysis, we see more semantic similarity between different words within the same class-construction than between the different forms of a single lemma. In group (i), we see how, relative to the semantic features in question, the transitive forms of *annoy* and *bother* group together. In contrast to this, the transitive use of *hassle* sees a distinct usage (ii), highly associated with instances of impositions and requests. Then a third group (iii) clusters the adjectival, nominal, and intransitive profilings of all three words.

Before we look more closely at the detail of these correlations, let us add another dimension to the analysis. Regional variation often has a profound effect on semantic variation. This is because even if a word or construction exists across all the varieties of a given language, this does not entail that it is used in the same manner. The countless 'false friends' between British and American English are testimony to this. However, if we distinguish the forms further, dividing between the British and American varieties, the analysis reveals an almost identical picture suggesting that there is little dialect variation at this onomasiological level. The plot in figure 4 visualizes a Bivariate Correspondence Analysis of class-construction distinguished for dialect, correlated with the semantic features of cause and affect.

By splitting the class-constructions into British and American variants we double the number of forms, leading to a denser plot. Moreover, splitting the data offers two datasets for comparison. Assuming there is no substantial dialect variation, this serves as an indirect way of verifying the results. In light of this, the most important result of the Correspondence Analysis visualized in Figure 4 is that the three basic uses across the onomasiological field are maintained. Indeed in terms of placement and proximity, the map is little different to that given by the Correspondence Analysis of the formal variation without the variable of dialect. The greatest difference in the results is that the outlying cause-affect features, with the exception of 'imposition' <imp>, have been 'brought into' the clusters. In the majority of cases, the dialectical pairs behave in the same manner. Only one pair splits between the different clusters; the Adjectival Construction for *bother*. Let us look again, this time more closely, at the clusters. We can zoom in on each of the clusters identified in Figure 4 to see what features and forms are correlated.
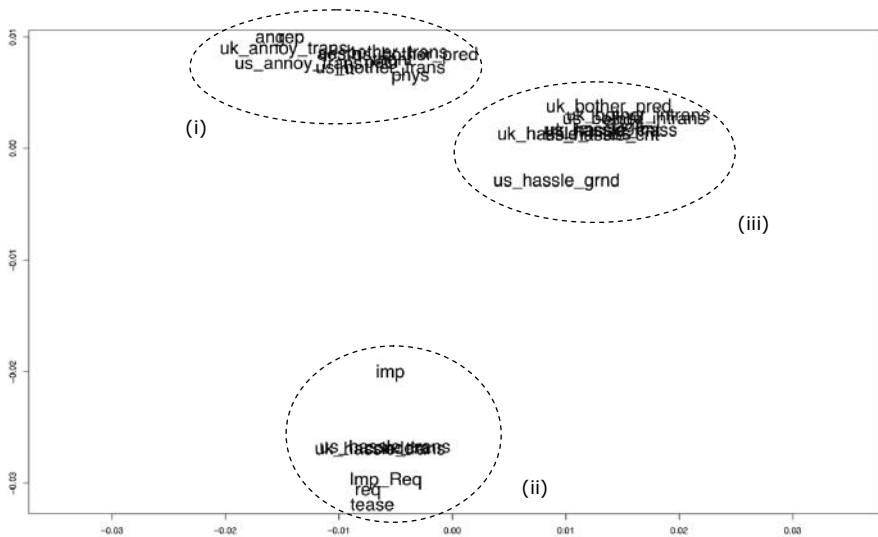

Figure 4. Correspondence Analysis of bother. Class-Construction-Dialect and Cause-Affect.
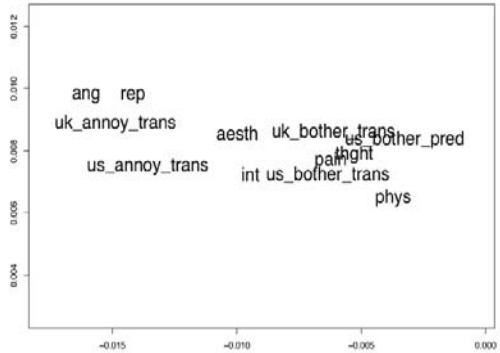
Usage Cluster 1

Dialect Class Form
a.   Transitive *annoy*
        Transitive *bother*

b.   Am. Predicative *bother*

Affect Features
a.   anger
        thought-concern
        emotional pain
        physical pain

b.   repetition
        interruption
        aesthetics

The most surprising result here is that the American predicative form of *bother* has been clustered with these transitive forms. By dividing the words into two dialectally distinguished forms, we substantially reduce the number of co-occurrences with the various semantic features. This may mean that for a relatively infrequent form such as the predicative *bother*, the results are erroneous. We will assume the accuracy of the correspondence analysis, but in this case, further investigation is necessary.

The two transitive forms of *bother* and *annoy* cluster with what seem to be two sets of similar semantic features. Firstly, there appears to be a semantic cline from the affect of 'anger' through 'emotional pain' and 'thought-concern' to perhaps 'physical pain'. The similarity of these semantic features suggests a clear 'meaning' is associated with these two forms. Moreover, the systematicity represented by the grouping of these semantic features adds weight to the argument that the analysis and annotation has successfully operationalized the subjective nature of these features.

The second sub-group of semantic features found here is less homogenous, but still reasonably coherent. This group, in contrast to the other features, includes causes that are of a relatively inconsequent nature. Causes such as 'repetition', 'interruption', or 'aesthetic displeasure' are similar in that they are little more than inconveniences for the patient.

The kind of usage in question can be explained by way of example. The 'anger', 'thought-concern', and 'emotional pain' uses of the transitive *annoy* and transitive *bother* are represented by examples (5). This is contrasted by examples (6), which are typical of causes such as 'interruption' and 'aesthetic displeasure'.

(5) a. *There are even people out there that annoy the hell out of me.* (Anger)
    b. *they can get 2 fuk.. im not gona let it bother me..* (Thought-concern)
    c. *It bothers me when I am starting to beg for people to think about me when I've never done it before. I cannot explain how I feel right now.* (Emotional pain)

(6) a. *oh on the last night the guys kept annoying him while he was trying to sleep.* (Interruption)
    b. *Ok, I don't really like my mood theme. I love Nightmare and all but the theme is bothering me for some reason.* (Aesthetic)

Usage Cluster 2

Dialect Class Form
        Brit. Transitive *hassle*
        Am. Transitive *hassle*

Affect Features
a.   condemnation
          tease

b.   imposition
          request
          imposition-request
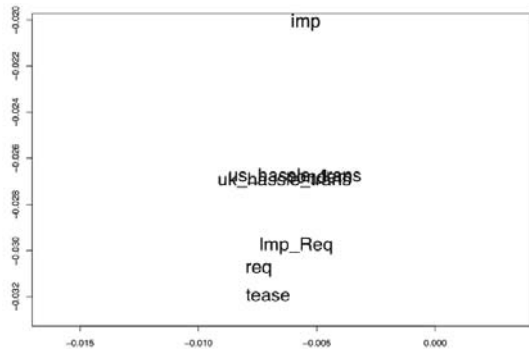
Here, we see that the transitive form of *hassle* stands out as a relatively unique usage. It is associated with two very clearly grouped sets of semantic features. Again the systematicity of the semantic feature groupings strongly supports the success of this variable's analysis and annotation. These groups include, on the one hand, 'tease' – 'condemnation' and on the other hand, 'imposition' – 'request' – 'imposition-request'. It seems that this form is distinct in its usage and possesses two relatively distinct mean-

ings. Examples (7) and (8) represent the two clusters of features and the kind of usage they indicate.

(7) a. *Some smokers also have a dream that someday the nonsmoking world will quit hassling them about their smoking.* (Condemnation)
     b. *Anyway today nothing excited happen excpet all my teachers had to be taught to be better teachers (their turn to be bored) and I had substitutes in every class. I hassled them and had fun doing it!* (Tease)

(8) a. *i saw him yesterday and he was being all touchy feely.....i don't want him back...but hes hassling me now and I fee sorry for liz(his new g/f).*(Imposition)
     b. *she had other ideas and hassled Dave to walk her to the train station.* (Request)
     c. *Ford and Greg: Nah, the real Glasgow neds hassle us for our wallets.* (Imposition-request)

Usage Cluster 3

Dialect Class Form

a.   Intransitive *bother*

b.   Mass *hassle*
        Count *hassle*
        Gerund *hassle*

c. Brit. Predicative *bother*

Affect Features
        energy
        agitation
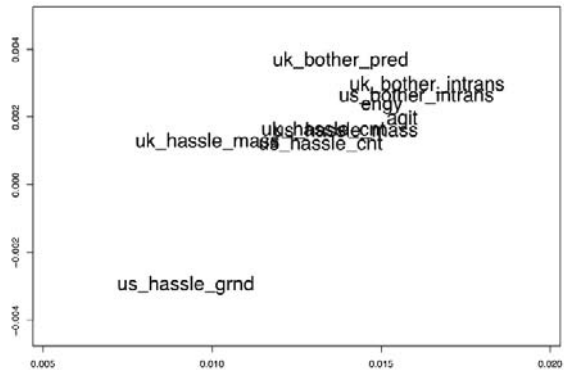
The third usage cluster of correlations includes the nominal-gerundive forms as well as the intransitive forms. Before the addition of the variable of dialect, it also included the adjectival forms. First, it must be noted that a wide range of forms are grouped relative to only two semantic features, 'expenditure of energy' <engy> and 'agitation' <agit>. Second, the first of these two semantic features is the most common of the dataset and the second is a relatively infrequent feature. From this, we can tentatively deduce

that in fact the non-verbal forms are associated with the 'expenditure of energy' relative to the verbal forms, which represent a semantically more complicated profiling. The correlation with the feature of 'agitation' is likely to be incidental.

Lastly, the British form of the predicative remains in this cluster where it was before we added the variable of dialect. This is in contrast to the American predicative form, which as we saw, is found in Cluster 1. However, by adding the variable of dialect, we increase the number of correspondences calculated by the analysis considerably. For a relatively infrequent form, such as the predicative *bother*, we are faced with a degree of data sparseness. It is therefore possible that the results presented in Figure 3 are misleading. If this were the case, it would leave all the non-verbal uses together and associate them with the single most common semantic feature, the 'expenditure of energy'. Further investigation is needed to determine if there is a distinction in use between the dialects and if this adjectival form does, in fact, divide along the lines suggested by the analysis.

Let us add one last variable, that of 'humour'. For such negative emotion terms as *annoy*, *bother* and *hassle*, this feature is clearly marked. It is important since it captures a difference that further distinguishes one of the forms, transitive *hassle*. In Figure 5, the most striking feature is that the clustering captured by the analysis remains stable after the addition of the extra variable.
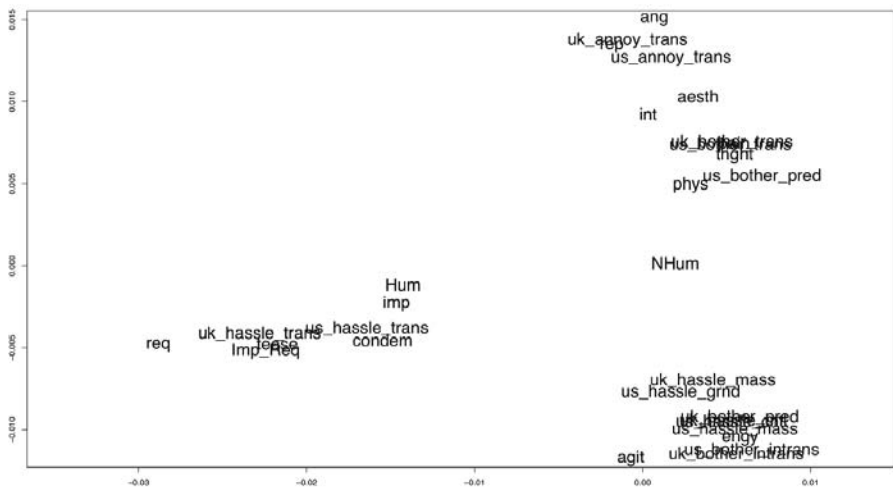

Figure 5. Multiple Correspondence Analysis of bother. Class-Construction-Dialect, Cause-Affect, and Humour.

This further re-assures us that the analysis is capturing real semantic structures extant in language use. However, the feature itself proves to be important. The lack of 'humour' <NHum> falls squarely between both the transitive *bother - annoy* cluster and the nominal-adjectival-intransitive cluster contrasted starkly by the clear correlation between the presence of 'humour' <Hum> and the transitive *hassle* uses. Example (9) captures the kind of uses in question.

(9) a. *Vicky spent most of the days hassling cows and sheep. Occasionally she would do a little skip or run for no reason.*
     b. *[...] sitting outside Mcdonalds and hassling kids for change, and taxing people. The west end is the Crewe chav centre, other wise known as "The Cronx".*

We can perform one last statistical analysis to help verify our findings. Hierarchical Cluster Analysis functions in a similar way to Correspondence Analysis, converting frequencies to distances. However, instead of plotting those distances, it uses a pre-determined distance measure to identify clusters. The visualization takes the form of a dendogram. This does not show what semantic features cause the clustering of the forms, but it does offer a clearer picture and allows us to include significance testing via bootstrap resampling. Bootstrapping is a complicated mathematical procedure for determining the probability that a given result will be repeated, given the same data. In the plot below, the different forms are clustered relative to the semantic features cause-affect and humour.

The results clearly verify the results of the Correspondence Analysis. Not only are the same clusters identified, a further more subtle distinction is added. Although the intransitive forms, adjectival, and nominal-gerund forms are grouped together, they are once again subdivided.

In the plot, the boxes drawn around the dendogram clusters are the bootstrapping results. Two different bootstrapping algorithms are used. The numbers at the top of the boxes represent the results of the bootstrap samples, the first number is the result of the more reliable multiscale bootstrap sample and the second number the simpler and less reliable normal bootstrap. The closer the figure is to 100, the better the result. In terms of probability we have excellent results that strongly suggest these clusters are accurate representations of the data.
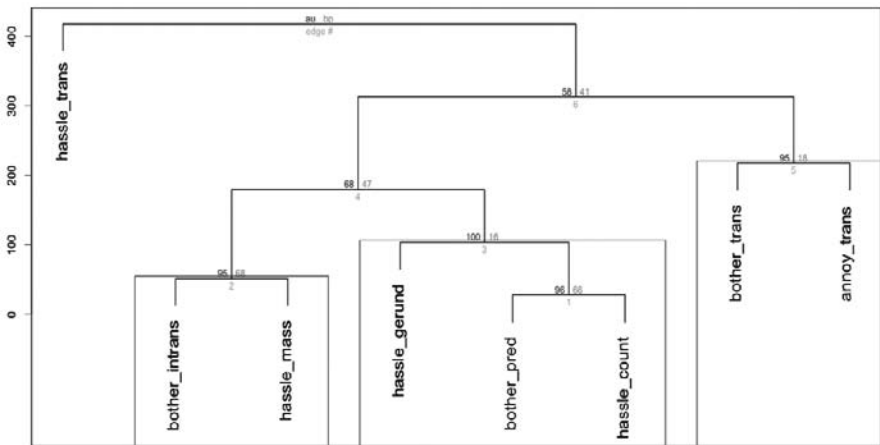
Figure 6. Hierarchical Cluster Analysis (Ward) bother. Class-Construction Cause-
        Affect.

Note that the Cluster Analysis identifies a distinction that is not apparent in the Correspondences Analyses. What was referred to as Cluster 3 above, is here subdivided into two sub-clusters: intransitive *bother* and mass noun *hassle* on the one hand versus gerund *hassle*, count noun *hassle,* and adjectival *bother* on the other. Investigation into this distinction is beyond the scope of the current study, but the Cluster Analysis suggests that there is a clear usage difference between these two groups. Most importantly, the bootstrapping on the Cluster Analysis offers us a means of verification for the results found in the Correspondence Analysis. It shows that there is an extremely high probability that if we repeated this study many hundreds of times, we would obtain the same groupings of form and usage.

    By way of conclusion, Figure 7 presents a box summary of the findings. The results, when summarized in this manner, resemble the lexical fields of the Structuralist era. However, the results presented here fall out from a mathematical logarithm that examines frequencies of co-occurring features of language use. This does not at all prove the results, indeed far from it, nor does it necessarily mean they are more accurate. However, it does mean that the analysis is repeatable. This can be done with similar data from the same corpus to verify that this is indeed an accurate depiction of the semantic structure associated with the three words for this kind of language. However, this verification can also be performed with different corpora of different kinds of language to determine to what degree the results are in-

fluenced by the register and mode of the language rather than the lexical semantic structure *per se*. These possibilities for verification are an important addition to Cognitive Semantic analysis, especially since this method can be expanded to more culturally rich concepts.

Despite the fact that the discrete boxes used to summarize the results of the Correspondence Analyses may be misleading in their simplicity, they do help appreciate how, via the careful semantic annotation of some 2,000 examples, quantitative investigation helps us map semantic structure. The diagram can be seen as a summary of the conceptual associations of different yet similar linguistic forms. By adding other semantic features, such as 'agent type' and 'patient type', 'topic of discourse', as well as more formal detail, such as variations in post-predicate argument structure and so forth, we could enrich this map, adding finer levels of granularity of formal and semantic detail. For this, perhaps extra examples would be needed since the more factors one considers simultaneously, the more data one requires. Nevertheless, this small study has hopefully shown how quantitative techniques can capture semantic similarity between words and do so while accounting for some of the multidimensionality of language.
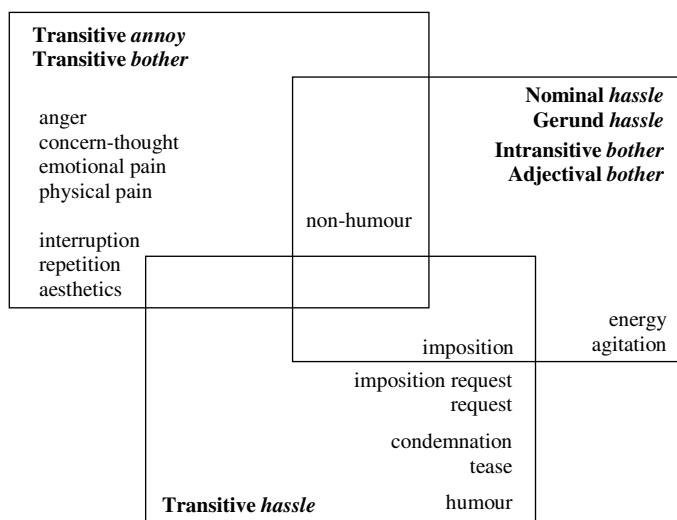

Figure 7. Box Summary bother. Class-Construction and Cause-Affect and Humour.

4.   Summary

This study has successfully made four points. Firstly, we have seen how quantitative and multidimensional techniques can help map usage patterns, patterns that theoretically represent the grammar of that language. In this way, we have seen how we can vary the level of granularity of the study by increasing the degree of formal details considered, contrasting a study at the level of the lemma with a study at the level of grammatical class and construction. Secondly, we have seen how it is possible to use direct semantic analysis in quantitative approaches. The semantic features in question may be determined subjectively, but the systematicity and intuitively coherent results demonstrate that careful analysis and annotation of even subjective semantic characteristics of language use is operationalizable. Thirdly, we saw how a simple statistical technique, Correspondence Analysis, can help capture the multidimensional correlations produced by the semantic analysis. Although the discussion did not directly compare Correspondence Analysis with other techniques that have been used to describe synonymous relations, the technique proved successful. Fourthly and returning to the first point, we have seen how the study of synonymy and semantic relations of similarity can be used to posit hypothetical conceptual structures. Since we argue that usage is conceptually motivated, the patterns in usage do not just represent grammar, but rather the conceptual structures argued by Cognitive Linguistics to motivate grammar. Quantitative usage-based studies of this kind, therefore, offer an indirect yet verifiable approach to the study of conceptual structure.

There are, of course, certain deductions that this study cannot draw. Firstly, we are in no place to make hypotheses about the categorization of the concepts. It may well be that in these instances, the frequency data do represent prototype effects and category structure, but until we understand the relationship between ontological salience and frequency, this is an assumption we cannot make. Secondly and similarly, we cannot draw any conclusions about the cognitive salience and the processing of the lexical semantics and its integration with the grammatical semantics. At this level, corpus-driven research must pass the torch to psychological experimentation, for its frequency counts offer few insights.

To the extent that the corpus is representative of language and to the extent that the dataset is representative of the corpus, we can propose a partial semantic map of the lexical encoding of the concept BOTHER. There are other words and expressions that should be included, just as different regis-

ters and modes of language, and so we cannot say that we have fully described the synonymy of these words or the conceptual structure they are used to represent. However, we have a partial map of the patterns of language use, patterns we argue indicate conceptual structure.

The next step will be to test these findings. This needs to be done at two levels. Firstly, new data from a different sample of language need to be analysed and the results compared. Secondly, confirmatory statistical techniques need to be used to demonstrate that for the datasets in question, the results are more than chance and do map, or model, the reality of the data. Perhaps in comparison to other methods of language analysis, these results seem conditional and limited. Even if this is true, the results are verifiable and are truly usage-based representations of the linguistic patterns that make up the grammar of a language.

Notes

1. Note that both authors have since stepped back from the stronger claims made in this vein. For more recent discussion on the relationship between frequency based evidence and cognition, see Glynn (2006, 2008b), Schmid (2007), and Gilquin (2008).
2. Further discussion concerning these lines of research and the methods used may be found in Tummers et al. (2005) and Heylen et al. (2008).
3. All examples are taken from a corpus built from on-line personal diaries, the details of which are given in section 2.2.
4. Glynn (2004, 2009) goes further to argue that lexical study is not at all possible without morpho-syntactic context. It is argued that grammatical semantics are inherently interwoven with lexical semantics and, regardless of redundancy, the only way to explain lexical structure is by simultaneously accounting for grammatical structure.
5. The importance of extralinguistic factors in Cognitive Linguistics is gaining wide acceptance. See Geeraerts (1995), Kristiansen and Dirven (2008), Geeraerts et al. (forthc.) for discussion and examples of this line of research.

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Collocation, anchoring, and the mental lexicon – an ontogenetic perspective

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1. Introduction

Collocations, seen in general as those multi-word units that are predominantly formed on the basis of the habitual co-occurrence of lexical items, are an essential part of any language. Their function is at least threefold for the language user: From a cognitive perspective, they reduce the cognitive load for speakers, as stringing words together and storing them as units in the mental lexicon functions as a shortcut that requires less processing work than combining them anew on each occasion. They can be seen as "time-buying sequences" (Wray and Perkins 2000: 17) that are responsible for fluency and thus help speakers in keeping their turn in conversation. From a pragmatic perspective, collocations form part of a native-like communicative competence (Pawley and Syder 1983: 208; Wray and Perkins 2000: 17–19), defined as co- and contextually adequate communicative behaviour, both with respect to production and comprehension (cf. Schmid 2003: 251). And finally, from a developmental perspective, collocations are an important "acquisitional aid" (Wray 2002: 119) as children's step-by-step analysis of so far un-analyzable chunks offers the young language learners additional vocabulary and an understanding of grammatical structures (Aitchison 2003: 198). All in all, one can claim that the acquisition of multi-word units and especially of collocations is a decisive factor in becoming and being a fluent speaker both in one's first language and foreign language(s). And it is this acquisition of collocations in the context of one's mother tongue and their relation to language processing in the mind that we will focus on in the present article.

The multiple functions of collocations for language users explain their treatment in different branches of linguistics. These focus on their various cognitive, semantic, distributional and pragmatic aspects, as well as their syntactic and grammatical perspectives. Explicit approaches to collocations are found in British Contextualism (Firth 1957; Halliday 1966; Sinclair 1991), derivative theories like Pattern Grammar (Hunston and Francis

2000), and in various lexicological and lexicographical approaches including Carter (1987), Lipka (2002), Jehle (2007) and Handl (in prep.). A most recent approach integrating corpus and cognitive linguistics is found in the collostructional analysis by Stefanowitsch and Gries (e.g., 2003).

Surprisingly enough, despite the above-mentioned, far-reaching importance for L1 speakers, collocations have been a rather neglected field in traditional first language acquisition research. Available studies date back more than 25 years (e.g. Brown and Berko 1960; Cruttenden 1981)[1] and do not focus on the acquisition of collocations proper, but rather treat collocations as a means to analyze related phenomena in L1 research such as the acquisition of syntactic rules and the language system in general. The most promising theoretical background for our developmental purpose is the usage-based explanation of language acquisition by Tomasello (2000b, 2003, 2005),[2] which finds some practical application in developmental studies edited by Clark and Kelly (2006a). This approach is closely related to the American tradition of Construction Grammar (Fillmore 1988; Goldberg 1995, 2006; Croft 2001) and centers on two major concerns also of interest here: Explaining and outlining how children learn multi-word units and how and why these change their character across development.

Construction Grammar in general is interested in the combination of linguistic items and their constructional environment, defining these constructions as "form-meaning pairs where some aspect of the form or meaning is not predictable from the component parts" and "as sequences of forms with open 'slots'" (Clark and Kelly 2006b: 3). Despite such explicit interest in lexico-grammatical multi-word units, and despite the fact that collocations and idioms were part of the initial motivation for proposing Construction Grammar (cf. Fillmore et al. 1988 on *let alone*) collocations are only dealt with implicitly. The overall aim of Construction Grammar is to come up with a cognitively oriented explanation of language processing and learning: "constructionist approaches demand answers to the question of how knowledge of language comes to be in the mind of a learner, and also to the question of *why* languages are the way they are" (Goldberg 2006: 18; original emphasis).

Construction Grammar rejects the strict separation of lexicon and grammar and postulates the existence of a lexis-grammar continuum (cf. Croft and Cruse 2004: 255).[3] In spite of this fundamental difference to Generative Grammar, Construction Grammar shares with the latter the overall aim of modelling grammar – rather than the lexicon or lexical co-occurrence tendencies. Interestingly, the history of Construction Grammar

is so far marked by the two somewhat opposing trends to focus on peripheral constructions of the *let-alone* or the *What's X doing Y* type (Kay and Fillmore 1999), on the one hand, and on the core of grammar constituted by argument structure constructions (Goldberg 1995), on the other. Neither of these strands has shown much interest in the type of predominantly lexical co-occurrence tendencies of words that we are concerned with here. This seems best to be explained with the "mediocrity of collocation" (Schmid 2003: 249). Being part and parcel of language, collocations are not spectacular enough to attract constructionists' attention, while at the same being too much situated in the lexicon to attract grammarians' attention. What is more, collocations are neither exclusively part of speakers' competence nor of speakers' performance in Chomsky's terms.

Their intermediate position in linguistics is reflected in Coseriu's concept of *norma*, a level introduced between *lenguaje* and *habla* (1967: 11), which can be defined "as the traditional, collective realization of the language system" (Lipka 2002: 112). Coseriu's theory is the only available explanation that acknowledges this special status of habitual language use as found in collocations. As a structuralist approach to language, however, it is neither interested in the developmental aspects of this norm nor in its pragmatic consequences and is therefore of no further practical use for our endeavor. In glaring contradiction to their ubiquity in language and their special role for language learning, collocations as a target of analysis have thus escaped a systematic and sound account in acquisition research, even in the most recent and well established cognitive approaches to language (development).

On the basis of a corpus-study of children's and adolescents's language, we will argue in the following with Croft and Cruse (2004) that along the lexis-grammar continuum collocations are a core type of constructions, as one of their criteria is that a frequent co-occurrence of words often leads to an additional semantic aspect in the collocation not found in the meaning of its single parts. The respective definition of constructions as partly unpredictable form-meaning pairings justifies their treatment in this context. In view of such definitional correspondence, their neglect in constructionist approaches is even more surprising.[4]

The purpose of this paper is to bring this special type of constructions, collocations, into ontogenetic focus by looking at their involvement in language processing across time. To this end we avoid a restriction on isolated stages in a speaker's development. Instead we adopt a life-course perspective as suggested by Eckert (1998) in order to cover the changing language

capacities with respect to collocational use across more than those first few years that traditional language acquisition research concentrates on. Such a comprehensive view is also in accordance with Wray and Perkins' (2000) integrated model of formulaic language that stresses the changing functions and proportions of multi-word units across time. In addition, we embed collocational acquisition in the more general background of holistic language processing. This cognitive perspective is our second focus, besides the developmental perspective on collocations.

Our overall research hypothesis contains both a pragmatic and a cognitive aspect. We claim that – from a pragmatic angle – the status of multi-item units changes from being used exclusively in a particular situation to wider applications across different situations and finally develops to a general native-speaker like usage. From a cognitive angle, this means that multi-item units change from representing un-analyzable chunks to providing a rich source of combinatorial options and pre-fabricated items. This development should also be reflected in how such multi-word items are anchored in the young speaker's developing mind.

The structure of our paper is as follows: After a short overview of the principles of language acquisition in general, we outline the acquisition of multi-word items in particular. Next, we will introduce the specific multi-word items under scrutiny, i.e. collocations, define the relevant categories for the pilot corpus study that follows in Section 4 and link up these categories with holistic and analytic language processing. Our paper ends with the presentation of first findings and with an outlook on further necessary research.

2. Learning a language is constructing a language

2.1. Principles of language acquisition

Looking at the majority of the literature on language acquisition, we find that children's linguistic development is usually presented and explained as if taking place in a compartmentalized way on the various levels of language, i.e. on the phonological, the morphosyntactic, the semantic, and the pragmatic level as well as in discrete stages such as 'one-word stage', two-word stage' etc. (cf. Goodman and Sethuram 2006: 263). However, the reason for introducing language acquisition as happening in more or less separate developmental units or steps lies more in the aim of making lin-

guistic descriptions of acquisition possible than in the actual existence of such separateness in nature: Especially in very early stages of development adult meta-linguistic categories are applied to children's communication, i.e. researchers artificially and prematurely separate and classify (see 4.2 below) the 'whole' that is only later developed into 'parts' by the young language learners themselves (cf. Tomasello 2003: 39). Thus child-specific psycholinguistic units that are different from adult ones are not sufficiently considered (cf. Tomasello 2000b: 62). This situation is of double interest for the present purpose: First, the development of collocation is part of language acquisition in general, that is, it can only be explained against the background of the general developmental trends and stages found in young children. Second, collocations themselves are situated on the phonological, morphosyntactic, the semantic as well as the pragmatic level of language, thus demonstrating how artificial the separation of language into its different levels is outside textbooks. This again links up with our general claim that collocations should be treated in their own right within the framework of Construction Grammar which negates the modular view of language as found in Generative Grammar and instead follows an integrated view of language.

Language acquisition is inseparably linked with children's social and cognitive development. According to Tomasello (2000b, 2003), both intention-reading, i.e. the capacity to understand others as communicative agents with particular intentions, and pattern finding, i.e. the universal human capacity to recognize repeating structures and build analogies on them (cf. Itkonen 2005; Gentner and Medina 1998), are the only viable explanations for a universally similar onset of language production around the age of a child's first birthday. Clark (1993: 241) observes that "[c]hildren acquiring very different languages appear to go through the same initial steps and rely on the same ontological categories".

Of great importance for explaining a child's journey towards adult communicative and linguistic competence is the idea of continuity, understood here in Clark's (1978) sense as the gradual process in language development where new knowledge is based upon previously acquired structures.[5] This holds especially with respect to the relatedness of gestural and verbal communication. Before children use language to communicate with their caretakers, they make use of gestures (and other non-verbal modes) to express different intentions (Lock 1980; Volterra and Erting 1990; McNeill 2000; Özçalişkan and Goldin-Meadow 2006). This demonstrates both their inherent need for communication and – at the same time – a basic under-

standing of the principles that govern such communicative interactions. Furthermore, gestural communication lays the foundation for construction use as "(t)he knowledge that they have about constructions when they begin to talk comes from their earlier gesture-based interaction" (Kelly 2006: 28–29).

Continuity is important in yet another respect, since it explains how children are getting from here to there with the same basic material (cf. Tomasello 2003), i.e. "when a higher abstraction is made the lower level, more concrete constructions and expressions do not necessarily go away but may remain available for use" (Tomasello 2003: 106). In accordance with a usage-based model of language acquisition the main difference between adult speakers and young beginners lies in the amount and duration of linguistic experience that allows for the "mastery of a structured inventory of meaningful linguistic constructions" (Tomasello 2003: 99). Linguistic experience in language development is closely related to input in general and child directed speech (CDS) in particular (cf. Lieven 1994; Snow 1995). As Tomasello (2003: 112) puts it, "many, indeed the majority, of utterances children hear are grounded in highly repetitive item-based frames that they experience dozens, in some cases hundreds, of times every day".[6] Linguistic input and experience need imitation as an important complementary activity on the side of the child to support and strengthen the learning process. What is more, repeated contact with specific linguistic structures embedded in a concrete context serves as a rich and vital source of both structural and semantic information (Aitchison 2003; Mintz 2006). Goodman and Sethuraman (2006: 270) claim that, with respect to constructions, "[v]ery young children are sensitive to such information in the language addressed to them, and they exploit it as they try to figure out the meanings of new words".

However, especially during the very early stages of development one has to bear in mind that children's abstractions are not simple mappings from the adult input to their own linguistic representations (cf. Lieven 2006: 105). As was already mentioned in a different context, children's cognitive and linguistic assumptions follow their own rules and create transitory stages of competence and performance that can only be interpreted correctly by researchers if these child-specific views are taken into consideration.

Basic communicative interaction begins very early around the age of nine months via prelinguistic vocal and kinesic modes. Language production proper starts around the age of one, and then children miraculously

speed up to become competent speakers. Nevertheless, language development is a life-long endeavor. "Language acquisition is a journey that begins in the fluid of the womb and continues throughout childhood, adolescence, and even beyond" (Karmiloff and Karmiloff-Smith 2001: 1). The majority of studies in language acquisition research, however, concentrate on the very first years, i.e. those developmental stages where we can witness the most dramatic changes in children's speech. In order to capture the multi-functionality of collocations across development we extend our focus and go beyond these earliest stages, thereby following researchers such as Nippold (1998) or Hoyle and Temple Adger (1998), who are also interested in the characteristics of development beyond the earliest years.

2.2. Acquiring multi-item units

As was outlined in the introduction, the way how children acquire collocations as a particular type of constructions has not attracted much, if any, attention so far. Therefore, the following subsection describes in a condensed form the development of multi-item units in general, suggesting that similar principles hold for collocations (see Subsection 4.2 for an empirical assessment of such claims). Choosing the concept of 'multi-item unit' instead of 'multi-word unit' reflects our underlying assumption that the principles of combining elements for communicative purposes are in place before children reach the official two-word stage, i.e. produce multi-word units proper.

   In early one-unit utterances (Tomasello 2003: 39) or holophrases, defined as "unparsed holistic utterances that correspond directly to a meaning" (Dominey 2006: 138), a single lexical item forms an early construction through its fixed embedding in a specific context of situation. It exists as linguistic gestalt not linked with any other construction in the child's mental lexicon and waits to be "filled out" (Tomasello 2000b: 66). In addition, so-called frozen phrases such as *wannaplay* are also learned as holophrases, and need to be broken down into their constitutive parts in order for them to be combinable in a more creative and productive fashion in a next developmental step.

   Children start combining lexical items on average between 18 and 24 months. In accordance with the principle of continuity in language acquisition (see above), an important predecessor of such combinatorial capacity is the joint use of gesture plus lexical item. Gestures supply information

which is both different from and complementary to the information conveyed by language. As Özçalişkan and Goldin-Meadow (2006: 33)[7] put it, "children's supplementary gesture-speech combinations both precede and predict oncoming changes in their spoken language development: Children typically produce supplementary gesture-speech combinations several months before they produce their first two-word combinations."

Intentionally combining two (or more) lexical items requires the insight that each element makes a separate contribution to the overall meaning and function of the utterance. However, just like holophrases before, children embed their early combinations in a concrete scene[8] and use the different components to refer to specific parts of this scene. Such early multi-word constructions, so-called *constructional islands,* exist on different levels of abstraction, ranging, according to Tomasello (2003: 113–114), from word combinations to pivot schemas[9] and, finally, item-based constructions. Whereas in word combinations the child produces two items as one intonation group with a single primary word stress and without an internal grading of the elements, pivot schemata are based on one structuring element with a primary and secondary word stress and an open slot – with restricted filling options – and item-based combinations show first true syntactic marking with two primary word stresses.

Despite such beginning internal syntactic organization, there is still no structuring across the various constructional islands. In order to overcome this stage, the above-mentioned principle of pattern finding applies. "As they attempt to comprehend and reproduce the utterances produced by mature speakers – along with the internal constituents of those utterances – they come to discern certain patterns of language use (including patterns of token and type frequency), and these patterns lead them to construct a number of different kinds of (at first very local) linguistic categories and schemas" (Tomasello 2000b: 73). As a result of such abstractions across the so far isolated item-based constructions, children filter out more and more general patterns, i.e. they enter the phase of producing abstract syntactic constructions, a developmental step that brings them closer to finally producing and comprehending novel linguistic combinations in a creative manner.

In general, multi-word units are the product of two dominating, co-existing principles in language (Wray and Perkins 2000: 9–11), i.e. formulaicity and productivity/creativity.[10] In acquisition "children need to move from formulae to schemata" (Dąbrowska 2000: 88). Whereas formulaicity is based on a high token frequency in the input that helps to entrench the already combined items in question, a high type frequency (i.e. variable

recurrence) informs children about the combinatorial possibilities of the single items and thus accounts for speakers' creativity and productivity (cf. Tomasello 2000b: 72) The formulaicity retained in adult language, which concerns first and foremost, but not exclusively, irregular multi-word units like restricted collocations or idioms can be explained with Wray's (2002; 2005) theory of 'needs only analysis', where a formulaic expression is only broken down into its constituents if the need arises, i.e. if the child encounters a paradigm of lexical items within one expression. This model convincingly accounts for the co-existence of holistic and analyzed multi-word units both in children and in adults.

> The sequences that are irregular in the adult language are the ones whose usage is such that they do not invite analysis. Because they are unanalyzed, they are able to retain obsolete vocabulary and structures. They are not an obstacle to the child's development of a set of regular grammatical rules, because the child is never tempted to analyze them (and neither is the adult...) (Wray 2002: 131–132).

Thus, multi-word units can be considered the linguistic manifestation not only of the principles of formulaicity and productivity but also of two different ways of language processing, i.e. holistic and analytic. Both methods exist, although to varying degrees, in the language of children and adults alike.

3. Multi-word units and language processing

3.1. Collocations as multi-word units

As shown in Section 2, the tendency of words to repeatedly co-occur is neither just a random nor an individual phenomenon, but a basic principle for the acquisition and mastering of language in general. Children do not learn a language in the form of isolated elements on the one hand and as a system of rules on the other. Instead they are constantly exposed to pre-combined linguistic chunks from which they have to abstract the lexemes and the grammatical rules of a language. Adult speakers follow this prefabrication path as a way to smoothen language production and reception.

Linguistic theory has only acknowledged the predominantly syntagmatic character of language for the last 50 years, i.e. since Firth (1957) and his followers promoted the notion of collocation within the tradition of British Contextualism. They emphasized that language does not operate as

a slot-and-filler-system, where lexis only plays the minor role of filling in positions determined by grammar. Postulating lexis as an individual linguistic level parallel to grammar in the 1960s[11] led to an increased interest in and concentration on lexical studies, eventually culminating in a focus on two basic principles on which language works, i.e. the idiom principle and the open-choice principle put forth by Sinclair (1991). According to the idiom principle, the majority of utterances are not produced by combining words from scratch, but by retrieving and re-using prefabricated or semi-prefabricated expressions that have been stored in the mind as units. This predominance of the idiom principle goes well with the observations made in first language acquisition, where ready-made constructions are the building blocks for acquiring words, meanings and, in a later stage, abstract rules.

In lexicology and lexicography collocation is used as a means to uncover the structure of vocabulary and to discriminate synonymous and polysemous lexemes via the connotation that is associated with a specific collocate. In this context the notion of semantic prosody (e.g. the negative connotation associated with the verb *to commit* that is taken over from usual collocates like *crime*, *murder*, *suicide*) plays a crucial role, leading to the claim that a language is made up of extended units of meaning (Sinclair 1996; Stubbs 2002). Looked at from a different angle this phenomenon also plays an important role in Pattern Grammar (Hunston and Francis 2000) and especially in the collostructional approach by Stefanowitsch and Gries (2003). At the same time it is in accordance with the assumption in Cognitive Linguistics and Construction Grammar that language consists of constructions, i.e. form-meaning pairings independent of their extent, a fact that also has consequences for the processing of language. As we have larger units at our disposal, we can react faster to the changing situations in conversation both as speakers and as hearers. The question now is how this kind of language processing emerges, and in which relation idiom and open-choice principle stand to each other in terms of the psycholinguistic processing of language. For our purpose we will adopt a multi-dimensional definition of collocation as an extended lexical unit, consisting of elements that are linked together to a major or minor degree (cf. Handl 2008). Collocation has seen multiple classifications, the most convincing one being an approach that arranges such phenomena on a continuum from free word combinations over collocations to idioms. This gradual character of collocations works on different linguistic levels and can be determined on the basis of three gradable criteria: predictability, frequency and idiomaticity. These three criteria lead to the basic dimensions along which collocations

can be described. The lexical dimension is characterized by the size and quality of the collocational range, i.e. the question which and how many collocational partners a lexical item can attract. If a word has many potential partners it has a tendency towards a free word combination; if the collocational range is restricted, i.e. if a word does not have many potential partners, however, it is similar to an idiom. The statistical dimension refers to the frequency with which a combination recurs in specific linguistic surroundings, e.g. a specific corpus. Again, very rare combinations are not considered good candidates for a collocation, nor are very frequent ones. And finally, the semantic dimension refers to the way the combination of items influences the meaning of the collocational partners. In this respect, both completely opaque combinations and transparent combinations are excluded from the collocational area.

Due to restrictions of our material (both natural restrictions according to speakers' age and their related lexical limitations and frequency restrictions according to the size of the available material), the paper focuses on the semantic component, supported by findings from the lexical dimension.

Based on these two aspects we categorize the gradual phenomenon of syntagmatic relations into 'lexical collocations' (defined as the co-occurrence of the search word with one or more specific lexical items, e.g. *have a look* or *more or less*), 'patterns' (defined as the co-occurrence of the search word with one or more semantically restricted slots, e.g. motion verb + *home*) (cf. Hunston and Francis 2000), and 'syntactic collocations' (defined as the co-occurrence of the search word with one or more semantically unrestricted slots, e.g. *big* + noun).

These three types, which underlie our pilot corpus study described in Section 4, are not only structurally different; they also allow conclusions about the cognitive processing of language (throughout linguistic development). In a lexical collocation, where the same word combination recurs unaltered, the type of processing is clearly different from a pattern or even a syntactic collocation, where the speaker has to fill in slots or decide on grammatical correlations. Either the understanding and retrieval works on the basis of strong predictability and the construction is firmly anchored in the mental lexicon or, in the other cases, variations are possible that can only be resolved with abstract knowledge of acceptable constructions in the language. Thus, the anchoring in the mental lexicon of a speaker ranges from item-based as in pure lexical collocations to more schematic anchoring as in patterns and syntactic collocations. The linguistic processing accordingly ranges from holistic to analytic.

3.2. Collocations as a mirror to language processing: What happens in the mental lexicon?

The above-mentioned characteristic features of human language, formulaicity and creativity, result from dual processing, both offering their respective advantages for speakers: "The advantage of the creative system is the freedom to produce or decode the unexpected. The advantage of the holistic system is economy of effort when dealing with the expected" (Wray and Perkins 2000: 11). Whereas adult speakers have both processing types at their command and apply them based on co- and contextual requirements, children utterly rely on holistic processing first, before they set out to apply analytic strategies that help them to understand the separability of chunks considered un-unalyzable before. Once they have realized that the way items are combined is not haphazard, but instead underlies repetitive patterns, they abstract more and more from these items to the underlying system. In the course of time they will enlarge their knowledge about grammatical structures, but they will also learn to rely on formulaic and prefabricated items in order to cope with the myriad of conversational challenges.
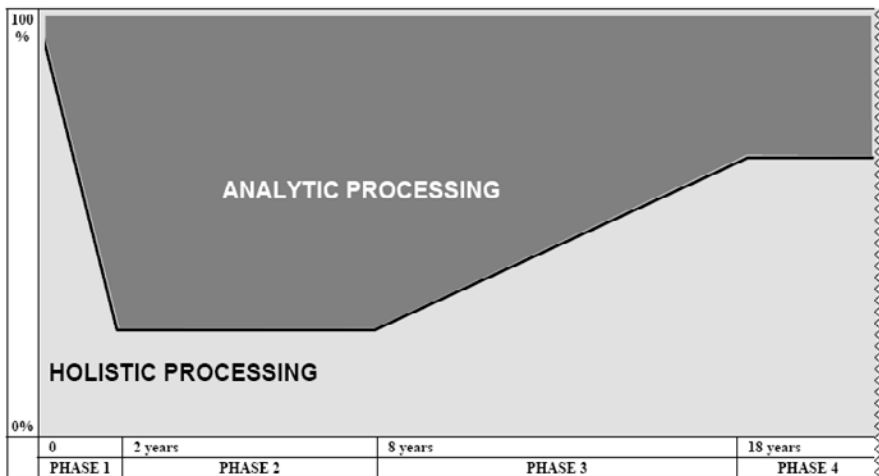

Figure 1. The relation between language acquisition phase and processing type (after Wray 2002: 133)

Generally, two basic types of language processing can be distinguished, which are distributed across the phases of language acquisition to a varying extent as outlined in Figure 1. Wray (2002: 132) observes that "during the child's longer term development towards adulthood, the relative proportions of holistic and analytic involvement in language processing alter, first in one direction and then in the other".

Wray's model illustrates the proportion of formulaic language in the different stages of development, beginning with a high percentage of holistic processing in the very first years, followed by an increase of analytic processing as an intermediate phase and finally going back to a large proportion of holistic involvement in the language of adolescents and adults.

Taking Wray's general model as the template we analyze multi-word units and ready-made word combinations as particular representations of language processing. It seems reasonable to suggest that the prevalent type of language processing in a speaker's mind is mirrored in the distribution of different types of multi-word units across the developmental stages. Thus, we would expect more lexical collocations in the language of very young children (phase 1), with prefabricated, fixed combinations being processed as units. Towards the end of this phase children become aware of the analyzability of these holistic items and split them up into separate items, so that we find more patterns in the intermediate stage (phase 2). As children work their way towards adult linguistic competence, they gradually increase the proportion of holistic processing, since they use the same recurrent fixed combinations again and again. Therefore lexical collocations should be the dominant type in the transitional phase 3 and, finally, in the adult phase 4. To be more precise, collocational involvement should change its status in the course of time from unanalyzable chunks to combinations with weaker or stronger internal links. If, as the theory suggests (cf. Subsection 2.2), children first acquire and use gesture-speech combinations, one could claim that this already forms part of holistic processing, as children work on the basis of extra-linguistic collocations, i.e. combinations of single lexical items with the contextual or situational information that together function as earliest units of meaning (e.g. *up* used in a situation with raised hands). In the course of development children would begin to decontextualize their first utterances. They use the linguistic element in a different situational context or even substitute the extra-linguistic element with lexical material taken over from the caretakers' input and form unitary, still holophrastic, utterances. A decisive next step for the proper acquisition of collocations would be children's growing awareness of the

separability of these chunks as well as the possibility of combining the resulting elements with other elements (e.g. *wannaplay*, *wannaget*). This awareness is the necessary prerequisite for using the separate elements in more and more adult-like collocations. From a constructionist perspective this can be summed up as follows:

> Thus, while children are picking up the most frequent forms and patterns that they hear in the language addressed to them, the suggestion is that these are initially not connected up into the network of constructions that allows adults the syntactic and conversational flexibility that they show in their language production and comprehension. (Cameron-Faulkner et al. 2003: 847)

In the corpus study described in the next section we have tried to provide first empirical evidence for the changing status of language processing and the role different collocation types play in this development.

4. A corpus study of collocations in the spontaneous language of children and adolescents

4.1. Material and method

The learning of collocations depends more than for other items on repeated exposure. It therefore seems appropriate to analyze them in authentic, spontaneous language in order to unveil their status and evolution throughout acquisition phases.

A corpus-based study lends itself perfectly to our purpose, as this allows an analysis of the emergence of new collocations and their development throughout the different stages. Unfortunately, there is no single English-language corpus available that includes all relevant years of language acquisition necessary for our life-course perspective, i.e. data from the beginning to adolescent language. We therefore put together material from three different already existing corpora, well aware of the problems of such a procedure, lack of homogeneity being one of its major ones. But as we want to shed light on the mental processing of multi-word items, we have to find out which collocation is acquired at what point in development and how the previously acquired set of collocations changes. For the life-course perspective adopted here, we thus need continuous material to cover the whole linguistic development.

For the very first years of language acquisition we chose material from the CHILDES corpus; data for the years 6 to 12 stem from the Polytechnic of Wales (POW) corpus and for the adolescent years up to the age of 19 from the Corpus of London Teenage English (COLT). Whereas the latter two are based on data from British English, the chosen CHILDES data contains both British and American English. Such variety differences can be ignored as we are not interested in the acquisition of specific colloca-tions in a particular language, but in the question when collocations as a general language phenomenon and as a particular type of language process-ing are acquired. Once these preliminary questions have been answered, questions of variety-specific collocations can be addressed in future analyses.

All in all, we used a corpus of roughly 27,000 words for our analysis. Figure 2 illustrates the proportions each corpus has in relation to the total amount of data.
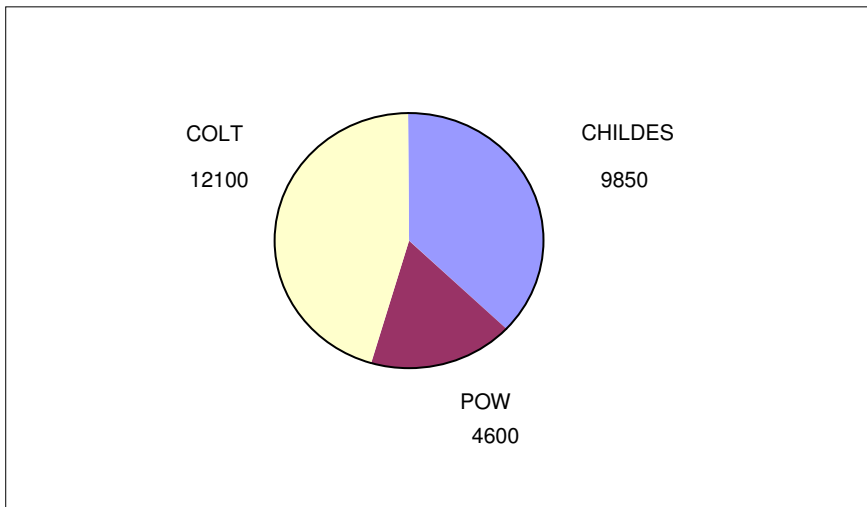
Figure 2. The corpus architecture on the basis of word types

In order to uncover the collocation types and the state of their acquisition we ran a corpus query for 20 search words taken from the data of the youngest children. These sections of the CHILDES corpus were later ex-cluded from the analysis. The selected items belong to four different adult word classes (noun, verb, adjective, preposition). In terms of children's conceptualization, they belong to general nominals, action words, modifiers and functors (cf. Tomasello 2003: 45). Other possible categories like per-sonal-social words, i.e. communicators, such as *bye-bye* and *thank you,* are

and remain formulaic parts of language and are therefore not included in our study. The search words, listed in Table 1, are also basic enough to be encountered in utterances of speakers of all age.

Table 1. The search words

general nominals	action words	modifiers	functors
home	*come*	*big*	*at*
toy	*have*	*more*	*in*
way	*hold*	*nice*	*out*
finger	*stop*	*red*	*over*
table	*tell*	*some*	*up*

For retrieving potential multi-word units from the data we fixed a span of two items to the right and two items to the left of the search word. This relatively narrow span takes into account children's mean length of utterance (MLU).[12] For the sake of consistency this span is not widened for older speakers. On the basis of these settings we ran a query in the three corpora yielding a list of possible collocates for each search word. This list was then narrowed down on the basis of the semantic criteria outlined above (see 3.1) with the help of a manual analysis considering co- and contextual information in order to exclude random co-occurrence such as *more + look* or free syntagmatic combinations such as *the + finger* or *people + home*. The final list of collocates (157 appearing in CHILDES, 164 in POW and 178 in COLT) is categorized according to our typology introduced in Section 3 in 'lexical collocation', 'patterns' and 'syntactic collocations'.

The proportion of the collocations in relation to the size of the respective corpora is very small, amounting to around 1.6% of CHILDES, 3.7% of POW and 1.5% of COLT. This cannot simply be seen as a consequence of the fact that the three corpora vary in size, but above all reflects speakers' growing vocabulary and communicative capacity. The very simple search words we had to select to capture multi-word items in the youngest speakers no longer play such an important role in the collocation production for older speakers, as they have more lexical material at their disposal. Thus, the relatively restricted span may also be a reason for the shallow increase of collocations toward the adult stage. Nevertheless, as shown in Figure 3, the proportion of collocations in the three different corpora in relation to all 249 collocations found for the search words increases constantly throughout the stages, with 63% of all collocations appearing in CHILDES and almost 72% in COLT.
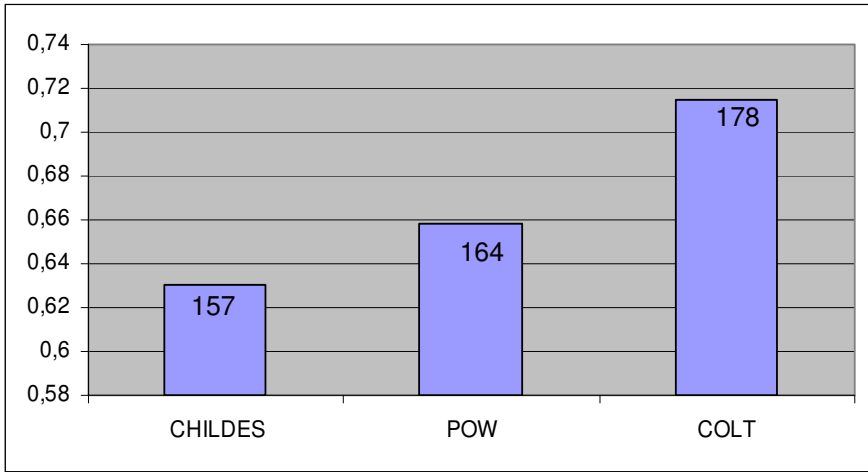
Figure 3. Relative distribution of search-word collocations in the corpora

4.2. Findings

The 249 collocations were entered into a database together with informa-tion about their distribution in the three corpora. The data was categorized into lexical collocations, patterns and syntactic collocations, depending on the variation of the collocates found in the material. By definition, lexical collocations only occurred in one form; patterns showed a certain amount of variability within a semantic area and syntactic collocations were re-stricted by syntactic aspects only. Typical examples of either category are given in Table 2. The spreadsheet shows the search word in the middle and the collocates within the span at either side of the node n. The numbers in the first columns refer to the three corpora, i.e. the three age-groups. Se-mantic restrictions are indicated with inverted commas, lexical restrictions are given in brackets.

The selection of highly frequent, everyday search words, of course, led to some problems. The group of functors triggered a number of phrasal verbs like *come off* or *work out* and also grammaticalized formulae like *at least* or *in fact.* Together with classical compounds, such as *table tennis/ football*, *toy car/dog/factory* or *red bricked*, they are categorized as lexical collocations. Another phenomenon calls for additional attention: In the language of the younger children, lexical collocations very often are indi-vidual manifestations of filled patterns (e.g. *to have lunch* as the only reali-

zation of the pattern *have* + N'meal'). Other filled patterns recurred with different lexical material and thus could not be assigned to one node only, such as *more or less*, *in and out* or *up and down*. They represent the pattern ANTONYM + *or/and* + ANTONYM, and were also treated as lexical collocations. The phenomenon of filled patterns would have been more frequent if we had had a larger corpus and more search words, which again would make it possible to deduce the patterns themselves. In our analysis, however, we stuck to the restricted number of search words and followed their collocational development. Coming back to Tomasello's usage-based approach (2003), the filled patterns in our corpus can be considered constructional islands that await more linguistic material to be used in a truly creative way.

Table 2. Examples from the corpus study

1	2	3	type	n-2	n-1	n	n+1	n+2
1	2	3	lexcoll		*how*	*come*		
1	2	3	lexcoll			*have*	*a*	*look*
1	2	3	lexcoll			*at*	*night*	
	2	3	lexcoll		*just*	*in*	*case*	
1		3	lexcoll		*what's*	*up*		
		3	lexcoll			*big*	*time*	
	2		lexcoll			*tell*	*jokes*	
1			lexcoll		*sore*	*finger*		
1			lexcoll		*better*	*tell*		
1			lexcoll			*hold*	*tight*	
1	2	3	pattern			*nice*	*and*	ADJ 'positive'
1			pattern			*big*	N 'large'	
1		3	pattern			*have*	*a*	N 'food'
1	2	3	pattern			*in*	*a*	N (*moment, second*)
1	2	3	pattern	*put*	DET	*finger*	ADV 'spatial'	
	2		pattern	V(*lose,find*)	*my*	*way*		
1	2	3	syntcoll			*have*	*to*	V
1	2	3	syntcoll			*more*	N	
1	2	3	syntcoll		Vcopula	*big*		
1	2	3	syntcoll	PREP	*the*	*way*		

The basic problem with patterns is to distinguish them from syntactic collocations. Just as there is a correlation between lexical collocations and patterns, there is also a kind of continuum from patterns to syntactic collocations. Mintz' (2003, 2006) notion of "frequent frames" encompasses both types, as the author makes no distinction between a semantically restricted slot and a purely grammatical one. In our analysis, however, a combination like *big* + NOUN was categorized as a syntactic collocation. If the noun, however, as in this case belongs to a set denoting large objects like *giant*, *monster*, *elephant* or *tower* we assigned it to the class of patterns.

Interestingly enough, the item *more* used in the literature as the stereotypical example of holistic expressions in very young children occurred neither as a lexical collocation nor as a pattern in our corpus. Instead, it could be classified as a syntactic collocation already in CHILDES, combining with quantifiers like *little*, *some*, *lot* or with a variety of nouns like *bricks*, *toys*, *animals*, *people*, *juice*, *milk*, *grapes*, *candy*, and verbs like *want*, *got*, *play*, *need*.

Despite these special cases, the overall findings from our corpus analysis – the relative distribution of the categories 'lexical collocation', 'pattern', and 'syntactic collocation' within and across the three corpora – showed as a tendency that the observed development of types of collocations mirrors the distribution of holistic and analytic language processing as suggested by Wray (2002): Syntagmatic relations develop from holistic to analytic and back to holistic structures in the analyzed data. Lexical collocations, being stored and retrieved from the mind as one unit, represent the prototype of holistic processing. And it is exactly this type that predominates both in the language of the youngest and again of the oldest speakers. Patterns, on the other hand, are the prevailing syntagmatic type in the POW data, i.e. the intermediate stage. They are manifestations of the speakers' growing awareness that what was handled as lexical collocations before can be separated in smaller units and re-used in a different context. This obviously points towards an increased analytical processing. Syntactic collocations remained stable throughout the three stages, always on a rather low level compared to the other two categories. Table 3 provides the raw frequencies of each category in all three corpora, which show that the total number of lexical collocations is more than twice that of patterns and almost seven times the number of syntactic collocations. This tendency is visible in all three corpora, with the two earlier stages having a less profiled distribution. What is more important for the present study than this corpus-

and age-specific relation between the three types is, however, their chang-
ing predominance across the developmental stages.

Table 3. Results from the corpus study

	total	LEXCOLL	PATTERN	SYNTCOLL
total	249	154	72	23
CHILDES	157	86	52	19
POW	164	81	65	18
COLT	178	107	53	18

In Figure 4, these results are presented as proportions of the categories in
relation to the overall number of collocations found in the respective cor-
pus. Thus for each category one can trace the change across time; e.g. lexi-
cal collocations start out with almost 55% in the youngest speakers, then
their proportion decreases to 50% in the intermediate stage and rises again
in the language of the older speakers to slightly over 60%. The reverse can
be seen for patterns. Their overall proportion of all collocations is smaller
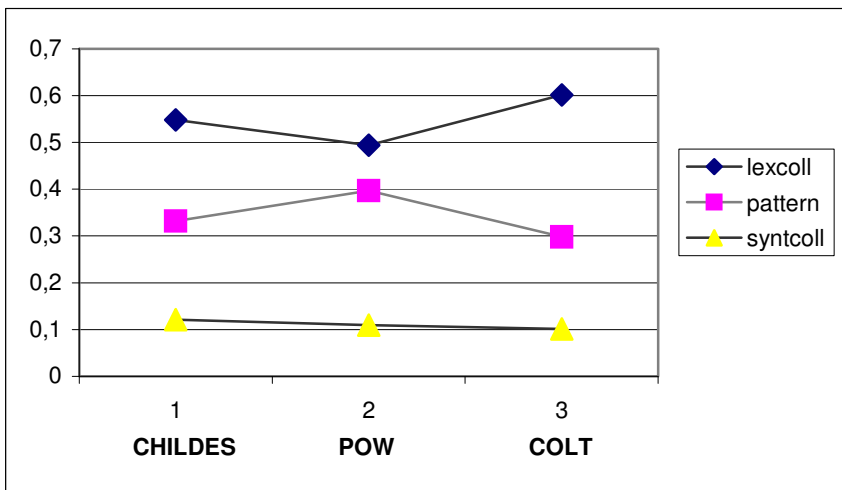with a peak of 40% in the language of 6-12 year olds.

Figure 4. The three categories across development

The transition from holistic to analytic processing can be considered a cog-
nitive development that is supported by the child's growing vocabulary. As

the child encounters more and more linguistic material in various constructions it will probably soon recognize that the lexical collocations acquired in the beginning are built from smaller units that can be used in other contexts. Thus patterns with variable slots are acquired. At the same time, the larger vocabulary leads to ever growing possibilities to fill these slots and, consequently, to more decisions children have to take. This higher cognitive effort for the speaker supposedly can be compensated for by an increased use of lexical collocations again. It seems therefore that the anchoring of collocations in the developing mental lexicon after the analytic period is related to a rise of the cognitive load. Furthermore, as collocations change their character in the course of time, they also seem to change their function, i.e. whereas in the younger children they serve as acquisitional aids, in adolescents (and adults) they serve as a means to fasten language processing.

5.   Conclusion and outlook

The present article has tried to shift the focus for language acquisition research and Construction Grammar to considering collocation not as a means to uncover (the learning of) syntactic structures but as a linguistic phenomenon in its own right. We are convinced that a phenomenon that receives so much attention in second language acquisition – due to its well-established importance for foreign language learners – merits the same attention in first language development. The article offers an extensive theoretical section before outlining the design and results of a first analysis of how children acquire collocations.

In this pilot study of collocations in first language acquisition we have been focusing on types of collocations as indicators for mechanisms of language processing and for children's mastering of the principles of formulaicity and productivity or creativity. In order to trace collocations' anchoring in the mental lexicon we have chosen a corpus of spontaneous language data.

The general design of the study was guided by two overall constraints: the restricted vocabulary of young children and the particular research interest. For the choice of search words used to trace the development of multi-word units across time the smallest common denominator is the vocabulary of young children, amounting to an average of 400 words at the age of 24 months, and to an average of 600 words at the age of 36 months

(cf. Clark 1993: 13–15; Tomasello 2003: 50ff; Butzkamm and Butzkamm 2004: 92–95).[13] Furthermore, the focus is not on the frequency of occurrence of single collocations but on the development of the above defined types of multi-word units as correlates of holistic and analytic processing. The question is how these are anchored in the mind and how this anchoring changes across development.

The following first findings can be reported: The youngest speakers, represented in the CHILDES corpus, produced more lexical collocations than the children represented in the POW corpus, who produced more patterns. The oldest speakers, represented in the COLT corpus, again produced more lexical collocations. This relative distribution of categories across the three age-groups suggests that the way language is processed changes from a predominantly holistic approach, via a more analytic one back to an adult-like co-existence of holistic and analytic processing, expressed in Sinclair's (1991) idiom and open-choice principle.

Based on these preliminary results we suggest further analysis in the form of association tests to clarify the process of mental anchoring of collocations. Eliciting possible combinations with respect to the same search words as used for this article would ideally back up the findings from the corpus study. The idea is to maintain the same age groups to draw a picture of the changing types of language processing. However, the focus would not lie on the different types of collocations, but on the possible variation within the answers to the stimulus words, thus uncovering the changing status of collocations in the mind from a purely cognitive perspective.

In addition, it would be rewarding to have a more detailed look at children's very first years, as presented e.g. in research by Lieven, Pine and others (cf. Lieven, Pine and Baldwin 1997; Lieven et al. 2003), in order to find the turning points in the development from holistic to analytic processing. This would imply a long-term case study of one speaker's acquisition and use of such units as proposed in Dąbrowska (2000: 87). A case study like this should also consider the co- and contexts of these formulae as well as – especially for the earliest years – the quality of the caretakers' input, i.e. their use of such word combinations (cf., e.g., Pine 1994).

Although much – outside this article – remains to be done in the context of collocation, anchoring, and the mental lexicon, we hope to have laid the foundation for further research of collocations as a particular type of construction, as an important clue to language processing in general and as a core component of children's developing language competence.

Notes

1. In contrast, second-language acquisition research extensively deals with questions such as how to teach collocations to foreign language learners and how best to represent them in learning material.
2. Tomasello's (2003) usage-based approach bridges the gap between linguistic theories that describe products and procedures of acquisition that set out – as models of process – to capture the dynamic properties of language as outlined in Clark (1993: 254–246).
3. A similar claim has been put forth in British Contextualism as illustrated in Section 3.1.
4. For a survey on the role of collocation in different linguistic approaches see also Gries (2007).
5. This is not to be mixed up with the continuity assumption as put forth by generative grammarians such as Chomsky, who claim that children have at their disposal the same linguistic structures as adult speakers and these linguistic capacities – contained in the human genome – need very little input to develop into the language specific, fullfledged adult system (cf. Tomasello 2003: 96; Dominey 2006: 138–139; see also Tomasello 2000a, 2000b).
6. For a detailed analysis of both utterance-level constructions and item-based constructions in mothers' input to their children and its reflection in the children's language see Cameron-Faulkner et. al (2003).
7. For a similar argument see Özçalişkan and Goldin-Meadow (2005); Iverson and Goldin-Meadow (2005).
8. In accordance with Tomasello (2003) we understand 'scene' both in its cognitive as well as in a pragmatic sense.
9. This notion is used following Braine (1963).
10. This can be seen as parallel to Sinclair's idiom principle vs. open-choice principle.
11. Cf. Halliday (1966) and Sinclair (1966).
12. The mean length of utterance (MLU) was introduced by Roger Brown (1973) to measure children's syntactic development. Based on the average length of children's utterances, Brown subdivided the major growth of syntactic development into five stages: Stage 1, MLU between 1.0 and 2.0, stage 2 MLU between 2.0 to 2.5, stage 3 MLU between 2.5 and 3.0, stage 4, MLU between 3.0 and 3.5, and, stage 5 with a MLU ranging from 3.5 to 4.0. According to Miller and Chapman (1981), Brown's stage 5 is reached around the age of four.
13. There are, however, huge differences with respect to the size of children's developing vocabulary as outlined in Fenson (2000). Considering the generally limited linguistic resources of young children, the differences between early and late talkers are especially striking.

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Part II: Grammatical patterns

The mean lean grammar machine meets the human mind: Empirical investigations of the mental status of linguistic rules[1]

Ewa Dąbrowska

1. Introduction

Many arguments in linguistics – particularly in the generative tradition – appeal to the principle of economy. Economy is usually equated with simplicity, generality, brevity, and capturing 'linguistically significant generalizations' (Chomsky 1962; Halle 1962; Kiparsky 1968). In the early days of generative linguistics, several attempts were made to develop a simplicity metric which would choose between competing grammars of the same language. One early discussion of this issue (Halle 1962; but see also Chomsky 1957; Kiparsky 1968) considers three alternative descriptions of a phonological process, viz.

(1)   /a/ is replaced by /æ/ if followed by /i/ and preceded by /i/.
(2)   /a/ is replaced by /æ/ if followed by /i/.
(3)   /a/ is replaced by /æ/ if followed by any front vowel.

Rule (2), Halle points out, is "evidently simpler" (1962: 56) than (1); therefore, other things being equal – that is to say, assuming that both can account for the data at hand – (2) should be preferred over (1). Likewise, (3) is simpler than (2) because it is more general, and thus is the better of the two rules, again assuming that both are descriptively adequate. Halle goes on to point out that if rule (3) is formulated in terms of segments (e.g. "/a/ is replaced by /æ/ if followed by /i/, /e/, or /æ/"), it is longer than rule (2), and concludes that phonological rules should be formulated in terms of features. Note that the premise of the argument – that (3) is better than (2), just as (2) is better than (1) – is assumed to be self-evident, and not requiring any justification.

The early attempts to develop a simplicity metric came under a great deal of criticism (see e.g. Matthews 1972; Peters 1972) and were eventually abandoned; but many subsequent developments in theoretical linguistics, generative or otherwise, were motivated by appeals to simplicity or ele-

gance (see e.g. Chomsky 1995, 1998; Fox 1999). General rules and principles are almost universally preferred to more specific ones; any rule or principle that can be subsumed under a more general statement is deemed redundant, and hence unnecessary.

Many linguists also assume, either implicitly or explicitly, that language learners have a similar preference for simplicity and elegance, and hence extract the most general rules compatible with the data they are exposed to: in other words, children, like linguists, will always choose rule (2) over (1) and (3) over (2) (cf. Halle 1962: 64). It follows from this that speakers exposed to a sample of linguistic data will converge on the same (maximally general) grammar compatible with the input which is in some fairly direct relationship with the linguists' grammar, since they are both governed by the same principles.

This general methodological stance, as well as the specific assumptions that follow from it, has been challenged by usage-based approaches to language. Proponents of such approaches (Langacker 1988, 2000; Bybee 2006; Barlow and Kemmer 2000) maintain that in mental grammars, low-level rules and specific exemplars co-exist with more general rules; and to the extent that linguistics aims to be a cognitive science, adequate linguistic description must reflect this. This view is articulated most clearly by Langacker, who proposes that

> lower-level schemas, expressing regularities of only limited scope, may […] be more essential to language structure than high-level schemas representing the broadest generalizations. A higher-level schema implicitly defines a large 'space' of potential instantiations. Often, however, its actual instantiations cluster in certain regions of that space, leaving other regions sparsely inhabited or uninhabited altogether. An adequate description of linguistic convention must therefore provide the details of how the space has actually been colonized. Providing this information is an elaborate network of conventional units including both constructional subschemas at various levels and instantiating expressions with unit status. For many constructions, the essential distributional information is supplied by lower-level schemas and specific instantiations. High-level schemas may either not exist or not be accessible for the sanction of novel expressions. (Langacker 2000: 30–31)

Langacker (2000: 29) illustrates the need for low-level schema with examples (rendered below as 4 to 6) from Luiseño, an Uto-Aztecan language spoken in California. Luiseño is a language which uses postpositions which are suffixed to nominals, as in (4).

(4)   a.   *ki-yk*
          house-to

'to the house'

b. *po-yk*
   he-to
   'to him'

On the basis of such data and similar expressions with other postpositions a learner could construct a general schema which specifies that the postposition follows the nominal: [N-P]. However, this schema only applies to inanimate nouns and to pronouns. When speakers wish to talk about a relationship involving an animate noun, they must use a different construction in which the noun is followed by a coreferential pronoun with a postposition:

(5)   *hunwut po-yk*
       bear   it-to
       'to the bear'

A simpler expression analogous to the examples in (4) is ungrammatical:

(6)   **hunwu-yk*
       bear-to
       'to the bear'

To account for these distributional regularities, Langacker proposes, we need three low level schemas: [N$_{inan}$-P], [PRON-P], [N$_{an}$ [PRON-P]]. A more general schema capturing the commonality between the first two local generalizations may also be available; however,

> [i]t is readily seen that the crucial distributional information resides in the lower-level schemas [N$_{inan}$-P], [PRON-P], and [N$_{an}$ [PRON-P]]. If the high-level schema [N-P] were accessible for the categorization of novel forms, expressions like **hunwu-yk* 'to the bear,' which conform to its abstract specifications, would be accepted as conventional. We must therefore suppose that [N-P] always loses the competition to be selected as the active structure; it is consistently superseded by the lower-level schemas as a function of its own non-salience and the inherent advantage accruing to more specific structures through their greater overlap with the target. Hence a form like *hunwu-yk* 'to the bear' would not be categorized by [N-P], but rather by either [N$_{inan}$-P], [PRON-P], or [N$_{an}$ [PRON-P]], all of whose specifications it violates. (Langacker 2000: 29–30)

A more traditional description of the same facts would simply state that Luiseño has a general rule or schema specifying that postpositions are suffixed to nominals and a more specific rule for animate nouns. Since these two rules – complemented by a general, and independently motivated, principle stating that specific statements pre-empt more general ones – provide an accurate and more economical description of the data, it is not clear why we should accept Langacker's proposal. In fact, the existence of systematic exceptions such as the animate noun + postposition is irrelevant to the question of whether speakers store more specific generalizations. Even if structures such as (6) were permissible in Luiseño, a grammar reflecting speakers' knowledge about the language might still have to include low-level schemas capturing the special cases – *if* it can be shown that speakers rely on such local patterns rather than more general schemas. However, we cannot hope to obtain the relevant evidence by doing 'armchair linguistics' – although armchair linguistics may provide us with some preliminary hypotheses. To find out how linguistic knowledge is represented in speakers' minds, we need to conduct psycholinguistic experiments.

This paper describes the results of several studies which address the question whether speakers' representations of the patterns of their language are indeed as general as the rules proposed by most modern linguists. In the next two sections, I summarize the results of several experimental studies designed to provide evidence about the generality of speakers' knowledge of inflectional morphology. I then look at a construction which has been extensively studied by syntacticians working in the generative tradition: English questions with long-distance dependencies. In the final section I discuss the implications of these studies for linguistic theory and methodology.

2.   Polish dative singular

My first example is an experimental study testing Polish speakers' productivity with dative singular inflections, described more fully in Dąbrowska (2008a). Dative case marking in Polish is fairly complex, in that there are four different endings, each applying to a different class of nouns: *-owi,* used with the great majority of masculine nouns (which normally end in a 'hard', i.e. non-palatalized, consonant in the nominative); *-i,* and its variant *-y,* used with 'soft stem' feminines (i.e. those ending in a 'soft' consonant followed by the gender marker *-a*); *-e,* used with 'hard stem' feminine nouns (which normally end in an unpalatalized consonant followed by *-a*);

and *-u,* which is used with neuter nouns (which normally end in *-o, -e* or *-ę*). There are some exceptions to these rules, notably deadjectival nouns (which take a different set of endings) and indeclinables (which, as the name suggests, do not decline at all), as well as a small group of nouns ending in a 'soft' consonant, of which some are masculine and take *-owi* in the dative, while others are feminine and take *-i.* These exceptions, however, are systematic (i.e., they apply in all cases, not just the dative), and in most cases readily identifiable – that is to say, nearly all the exceptional nouns are non-canonical in some way (see Dąbrowska 2004a). For 'canonical' nouns, i.e. those ending in a hard consonant, *-a, -o, -e,* or *-ę,* which constitute over 90% of the noun vocabulary, the dative ending can be reliably predicted from the phonological form of the nominative.[2]

These rules (as well as other inflectional rules in Polish) make reference to large, phonologically heterogeneous classes of nouns, or large 'spaces' of potential instantiations: masculines (or nouns ending in a 'hard' consonant), hard-stem feminines (or nouns ending in a 'hard' consonant followed by *-a*), soft-stem feminines (nouns ending in a 'soft' consonant followed by *-a*), and neuters (nouns ending in *-o, -e,* or *-ę*). Each of these large spaces can be divided into smaller regions or neighbourhoods – for example, nouns sharing the same number of syllables, the same stem-final phoneme, or the same final syllable; and we would expect some of these to be more densely populated than others. If Langacker's claim that speakers have highly-entrenched low-level schemas for densely populated neighbourhoods is correct, we should be able to find an advantage for nouns belonging to such neighbourhoods in tasks tapping inflectional knowledge.

To test this prediction, we must operationalize the concept of 'neighbourhood'. For the purposes of this study, a neighbourhood is defined as the set of nouns sharing the vowel in the penultimate syllable and all the segments to the right of that vowel. To establish how densely each neighbourhood was populated, a large electronic dictionary (Szymczak 2004) was searched for nouns with the same stem endings. Two high-density and four low-density neighbourhoods were identified for each gender. High-density neighbourhoods comprised nouns ending in *-ator, -olog* (masculines), *-arka, -encja* (feminines), or *-ęcie, -isko* (neuters); they contained on average 232 nouns.[3] Low-density neighbourhoods were defined by the stem endings *-onys, -otys, -odzioch, -astoch* (masculines), *-emfa, -urfa, -yzia, -ezia* (feminines), or *-ydro, -ogro, -ępie, -ypie* (neuters) and did not contain any nouns at all (i.e., there are no nouns in the dictionary with these endings).

Since the inflected forms of familiar nouns may be available as preconstructed units, the experiment used nonce (novel) nouns. There were 24

nonce words in total, eight for each gender. Within each gender half the words belonged to high-density neighbourhoods and the other half to low-density neighbourhoods. All the words were three syllables long and had gender-typical endings (hard consonants for masculines, *-a* for feminines, *-o* or *-e* for neuters); thus, the nouns' gender could be reliably predicted from the phonological form of the nominative.

Thirty-six adult native speakers of Polish participated in the experiment. A quarter of the participants were third-year university students; the others were all in full-time employment in a variety of occupations: cleaners, child minders, library assistants, engineers, managers, and academics. All participants had had at least 8 years of formal schooling; the most highly educated ones had doctorates.

The participants were asked to complete a written test. Each item on the test consisted of a lead-in sentence which introduced the nonce noun in the citation form, i.e. the nominative (printed in boldface) and gave a simple definition, followed by a second sentence containing a blank in a grammatical context requiring the dative:

(7)   ***Szabydro***   *to   świetne   lekarstwo   na   przeziębienie.   Dzięki* _____ *od razu się lepiej poczujesz.*
'**Szabydro** is a very good medicine for colds. Thanks to _____, you will feel better immediately.'

Participants were asked to write the nonce word in the blank in the appropriate grammatical form. The dative form was elicited in two different grammatical contexts: after the preposition *dzięki* 'thanks to', as in example (7), and after the verb *przyglądać się* 'to look at attentively'.

The results of the experiment are presented graphically in Figure 1. As can be seen from the figure, participants supplied the target inflection more reliably with words from high-density neighbourhoods, which suggests that they do indeed rely on low-level (morpho)phonologically specific schemas: in other words, rather than having a single rule which applies to all masculine nouns, they have several rules applying to specific subclasses of masculine nouns such as 'masculines ending in *-ator*' and 'neuters ending in *-isko*'. Most participants were also able to inflect at least some words from low-density neighbourhoods, which suggests that they also have more general schemas. However, as hypothesized by Langacker, these are less entrenched, and hence are not applied as reliably as the low-level generalizations. For nouns from low-density neighbourhoods, performance was best for masculines, followed by hard-stem feminines, soft-stem feminines, and

worst on neuters. This order mirrors the size of the domain of applicability, and hence is readily interpretable as a type frequency effect: speakers are more likely to generalize affixes which apply to larger classes (Bybee 1995; Dąbrowska and Szczerbiński 2006; MacWhinney 1978). These differences disappear in high-density neighbourhoods, as one would expect if low-level schemas pre-empt more general ones. The only exception to this is low-density neuters, where performance is much lower than for the other two genders. This may be due to the fact that, although high-density neuter neighbourhoods contain as many nouns as the masculine and feminine neighbourhoods, the nouns they contain are used less frequently in the dative than the masculine and feminine nouns. (Neuter nouns are overwhelmingly inanimate, and some uses of the dative are restricted to animate nouns: see below).
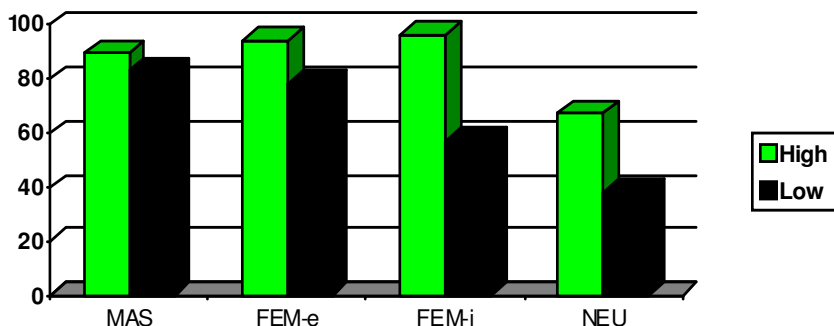
Figure 1. Proportion of target responses in the nonce word inflection task

The experiment also revealed considerable individual differences in performance. Scores on the inflection task ranged from 29% to 100% correct – and from 8% to 100% for nouns from low-density neighbourhoods. Moreover, the differences were strongly correlated with the number of years spent in full-time education ($r = 0.72$, $p < 0.001$; see Figure 2). Importantly, nearly all participants, including those with little schooling, performed well on masculine words from high-density neighbourhoods, and at or close to ceiling on high-density feminine nouns. This shows that they had understood the task and were willing and able to perform it. Follow-up studies demonstrated that the less educated participants reliably supplied the correct inflection with real words in the same grammatical contexts, and were able to choose the correct gender-marked form of the demonstrative adjective required by the nonce words. Thus, their poor performance on the in-

flection task is not attributable to inability to identify the gender of the nonce noun or lack of lexical knowledge about the case selection properties of the verb and prepositions used to elicit the dative case, but to limited productivity with the dative endings themselves.
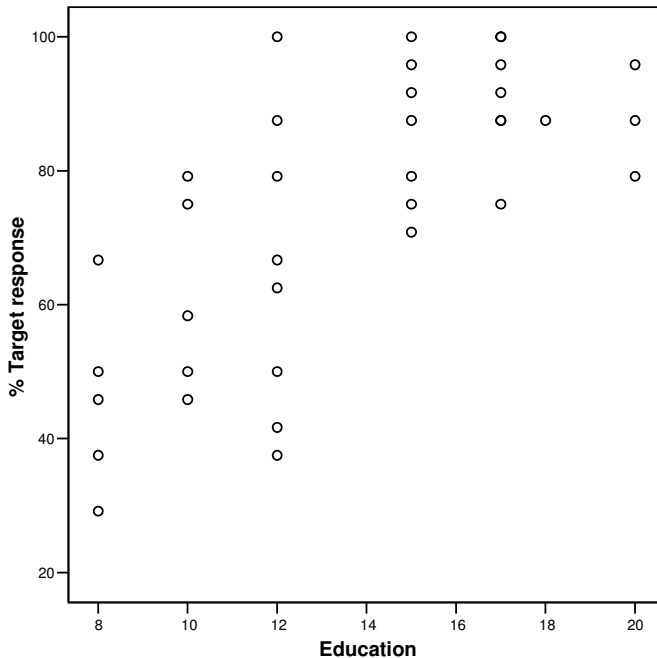
Figure 2. Relationship between education and productivity with dative inflections

The most likely explanation for the education-related differences in performance is that they are a result of differences in linguistic experience, specifically, in the amount of exposure to written texts. The dative case marks the semantic roles of experiencer, recipient, addressee and beneficiary. All of these roles are strongly associated with animate (typically human) and highly topical participants, and are typically realized in spoken discourse by pronouns, proper names, or kinship terms. As a result, dative-marked nouns are relatively infrequent in spoken discourse, and are restricted to a relatively small number of types.[4] The dative case is also required by certain verbs and prepositions, for instance *dzięki* 'thanks to',

wbrew 'in spite of', *ku* 'towards' (archaic), *przeciwko* 'against', *dziwić się* 'to be surprised at', *przeciwstawiać się* 'to oppose', *ulegać* 'to succumb', *sprzyjać* 'to favour, be propitious', *zagrażać* 'to threaten'. These constructions are less restricted semantically in that they allow a wider range of nouns, including inanimate ones. However, they are mostly fairly high-register or even archaic, and thus tend to be used primarily in written language. This is readily seen if we compare the proportion of inanimate nouns used in the dative case in child-directed speech (1.4%), adult conversation (14%), and written language (62%).[5] Because of these differences in the distribution of dative constructions, language users who are exposed to language primarily through the spoken medium encounter relatively few exemplars of nouns inflected for the dative case to generalize over, and hence fewer opportunities to develop well-entrenched general schemas.

3.   Converging evidence from other studies

The results of the Polish dative experiment strongly suggest that speakers prefer low-level schemas to general rules, and in some cases may not develop more general rules at all. In this section, I briefly summarize some converging evidence from research on several morphological subsystems in other languages.

Wolff (1981) describes a nonce word inflection experiment designed to reveal German speakers' knowledge about the past participle formation rule. The past participle in German is normally formed by adding the prefix *ge-* (and, for weak verbs, the suffix *-t*) to the verb stem: thus, the past participle of *sagen* 'say' is *gesagt.* With some verbs, however, the prefix is omitted. These include verbs with unaccented inseparable prefixes such as *be-, er-,* and *zer-* (so the past participles of *besuchen* 'visit', *ersetzen* 'replace', and *zerstören* 'destroy' are *besucht, ersetzt,* and *zerstört* respectively, not **gebesucht, *geersetzt,* and **gezerstört*); verbs with infinitives ending in *-ieren* (so the past participle of *studieren* 'study' is *studiert,* not **gestudiert*); and some lexical exceptions (e.g. *miauen* 'miaou', past participle *miaut,* not **gemiaut*). All of these exceptional verbs begin with an unstressed syllable, so an alternative formulation of the rule would simply state that *ge-* is added only when the initial syllable of the verb is stressed. Both accounts are descriptively adequate, but the first one ('add *ge-* except when the verb begins with an inseparable prefix, ends in *-ieren,* or belongs to a small class of verbs explicitly marked in the lexicon') is more complex

and does not capture the crucial generalization, so a linguist would always opt for the second rule.

What about ordinary speakers? To find out, Wolff (1981) asked German speakers to supply the past participle forms of four types of nonce verbs:

(a)   verbs with unaccented inseparable prefixes;
(b)   verbs with infinitives ending in *-ieren*;
(c)   verbs with an unstressed syllable which did not belong to either of these categories; and
(d)   control verbs with syllable initial stress.

He found that most participants consistently supplied *ge-* in the control condition and consistently omitted it in conditions (a)-(c). However, a size-able minority of 38% omitted *ge-* in conditions (a) and (b) and supplied it in conditions (c) and (d) – in other words, they appear to have missed the crucial generalization and internalized the 'messy' rule. Interestingly, less educated participants appeared to be more likely to prefer the messy rule, although the difference between the groups is not statistically significant. Wolff concludes that

> the [language acquisition] mechanism seems content to settle for any rule, however complicated and ad hoc, which provides observational adequacy; that is, any rule that 'works' in the sense of accounting for the corpus of data to which the individual has been exposed during his process of language ac-quisition [...] although linguistic theory understandably shuns ad hoc formu-lations and strives for maximum generalization and simplicity in its evalua-tion and writing of grammars, it does not appear that we can assume that the brain necessarily does so too. (1981: 10–11)

Another kind of converging evidence can be found in Albright's work on 'islands of reliability' (Albright 2002; Albright and Hayes 2003). Albright and Hayes (2003) note that most morphological rules apply more reliably in certain phonological contexts than in others: for instance, the English regu-lar past tense rule applies to all verb stems ending in a voiceless fricative (*kiss, miss, cough* and so on are all regular), but not to all verbs ending in a voiceless stop or a voiced fricative (*get, break, freeze, leave, weave* are irregular). They then go on to show that speakers are sensitive to the exis-tence of such 'islands of reliability'. When asked to supply the past tense form of a nonce verb ending in a voiceless fricative, English speakers con-sistently use the regular inflection: for instance, they always supply *driced* as the past tense of *drice*. However, when the verb ends in a voiced frica-tive or a voiceless stop, speakers sometimes produce irregular forms: thus,

they occasionally supply *doze* and *proke* as the past tense forms of *dize* and *preak*. In a second experiment, Albright and Hayes asked their subjects to rate the acceptability of past tense forms on a scale from 1 to 7. The results were similar in that past tense forms of verbs belonging to islands of reliability received higher ratings, e.g. *driced* was rated as better than *dized* and *preaked*.

Albright (2002) reports similar results for Italian. In this study, speakers were presented with first person singular forms of nonce verbs and asked to rate the acceptability of the corresponding infinitives. Again, judgements varied as a function of environment reliability: forms belonging to islands of reliability were given higher ratings. Thus, although in principle speakers could get by with just one default rule, they also acquire a set of more specific (and more reliable) rules corresponding to various special cases.

4. Questions with long-distance dependencies

My next example is a syntactic construction, English questions with long distance dependencies (henceforth LDDs). What is interesting about such questions is that they exhibit a dependency between a WH word in the main clause and a 'gap' in a subordinate clause. The dependency is 'unbounded', that is to say, in principle, there can be any number of clauses between the filler and the gap (indicated by the underscores in the following examples):

(8) a. *What did Steve believe that Chris needed __?*
     b. *What did Steve believe that they thought that Chris needed __?*
     c. *What did Steve believe that they thought that Maria imagined that Chris needed __?*

However, real-life questions with long-distance dependencies are very different from these constructed examples (see Dąbrowska 2004b, in preparation; Verhagen 2005, 2006), as illustrated by the following examples from the spoken part of the British National Corpus:

(9) a. *What do you think you're doing?*
     b. *Who do you think you are?*
     c. *What do you think it means?*
     d. *Where do you think that goes?*
     e. *What did you say the score is?*

As shown by Dąbrowska (in preparation) attested LDD questions – at least those occurring in speech – are very stereotypical: the main clause auxiliary is usually *do* (96% of the time), the subject *you* (90%) or another pronoun (a further 9%), and the verb *think* or *say* (86%); furthermore, 95% lack a complementizer, and only 2% contain an additional element such as a direct object or some kind of adverbial modifier in the main clause. None of the 423 LDD questions extracted from the spoken BNC analysed in the study involved a dependency over more than one clause.

These facts have lead some researchers in the usage-based framework (Dąbrowska 2004b, 2008b; Verhagen 2005, 2006) to propose that speakers have ready-made lexically specific templates such as *WH do you think S-GAP?* and *WH did you say S-GAP?* which enable them to produce prototypical LDD questions such as those in (9) simply by inserting lexical material in the WH and S-GAP slots. Of course not all LDD questions are prototypical – in fact, about 33% of the LDD in the spoken BNC corpus depart from the template in some way (e.g. contain a different subject or a different verb or an optional element such as a complementizer or adverbial phrase); and 5% depart from the prototype in more than one respect. Such nonprototypical questions could be produced either by using a more general template (e.g. WH AUX NP *think* S-GAP or WH AUX NP S-VERB (*that*) S-GAP?, where S-VERB is a verb that takes sentential complements) or by modifying the lexically specific template (see Dąbrowska 2008b for some suggestions about how this might work). Either way, usage-based models stipulate that prototypical LDD questions – those that match one of the templates – enjoy a special status, that is to say, they are psychologically more basic than non-prototypical ones. This is a hypothesis that makes testable predictions: for instance, we would expect that prototypical questions are produced more fluently, judged to be more acceptable, remembered better, and acquired earlier by children – and as it turns out, we now have evidence showing that all four of these predictions are correct.

With respect to fluency, Dąbrowska (in preparation) counted the number of dysfluencies – pauses, filled pauses such as *er*, false starts and self-corrections – in prototypical and non-prototypical LDD questions in the spoken part of the BNC. Forty-six out of 286, i.e. 16% of prototypical LDD questions contain some kind of dysfluency. For non-prototypical questions, the corresponding figure is almost twice as high (38 out of 137, or 28%). The difference is statistically highly significant ($\chi^2(1) = 7.90$, $p = 0.005$). Questions that depart from the LDD template are also judged to be less acceptable. Dąbrowska (2008b) asked adult native speakers of English to rate the acceptability of prototypical, nonprototypical, and unprototypical

LDD questions. Prototypical questions had the form *WH do you think S-GAP?* or *WH did you say S-GAP?*. Non-prototypical questions deviated from the prototype in just one respect: they either had a proper noun instead of the second person pronoun as the subject of the main clause or they contained an auxiliary other than *do,* a verb other than *think* or *say*, an overt complementizer, or an extra complement clause. Unprototypical questions deviated from the prototype in all these respects. In addition, participants were also asked to rate the acceptability of declaratives corresponding to the questions and some clearly ungrammatical sentences.

The types of sentences used in the experiment are exemplified in Table 1. Note that all the experimental sentences were 12 words long (13 if they contained a complementizer) and contained two subordinate clauses. The ungrammatical sentences were somewhat shorter (8-12 words). Participants were asked to rate each sentence on a scale from 1 (completely unacceptable) to 5 (completely acceptable).

Table 1. Examples of stimuli used in the acceptability judgement experiment

Condition	Example
Experimental sentences	
WH Prototypical	*What do you think the witness will say if they don't intervene?*
WH Subject	*What does Claire think the witness will say if they don't intervene?*
WH Auxiliary	*What would you think the witness will say if they don't intervene?*
WH Verb	*What do you believe the witness will say if they don't intervene?*
WH Complementizer	*What do you think that the witness will say if they don't intervene?*
WH Long	*What do you think Jo believes he said at the court hearing?*
WH Unprototypical	*What would Claire believe that Jo thinks he said at the court hearing?*
Grammatical controls	
DE Prototypical	*But you think the witness will say something if they don't intervene.*

Table 1. cont.

DE Subject	*And Claire thinks the witness will say something if they don't intervene.*
DE Auxiliary	*You would think the witness will say something if they don't intervene.*
DE Verb	*So you believe the witness will say something if they don't intervene.*
DE Complementizer	*So you think that the witness will say something if they don't intervene.*
DE Long	*So you think Jo believes he said something at the court hearing.*
DE Unprototypical	*Claire would believe that Jo thinks he said something at the court hearing.*
Ungrammatical Controls	
*That	**What did you say that works even better?*
*Complex NP	**What did Claire make the claim that she read in a book?*
*Not	**Her husband not claimed they asked where we were going.*
*DoubleTn	**His cousin doesn't thinks we lied because we were afraid.*

The participants' ratings are summarized in Figure 3. Apart from replacing *you* with a proper name,[6] each of the manipulations described above had an adverse effect on the acceptability of LDD questions and no effect, or the opposite effect, on declaratives: thus LDD questions with the verbs *believe, suspect*, *claim,* and *swear* were judged to be significantly less acceptable than questions with *think* and *say*, while the corresponding declaratives were slightly better (though the difference was not statistically significant); questions with an overt complementizer and questions with the modal auxiliaries *will* and *would* were less acceptable than their prototypical variants, but there was no difference between the corresponding declaratives; and questions with very long dependencies (across two clause boundaries) were judged to be much worse than prototypical LDD questions, while their declarative counterparts were better than the 'prototypical' declaratives. Unprototypical questions were judged to be just as bad as *that* trace violations (**What did you say that works even better?*) and sentences in which

third person agreement was marked on the auxiliary as well as the main verb (*His cousin doesn't thinks we lied because we were afraid*).
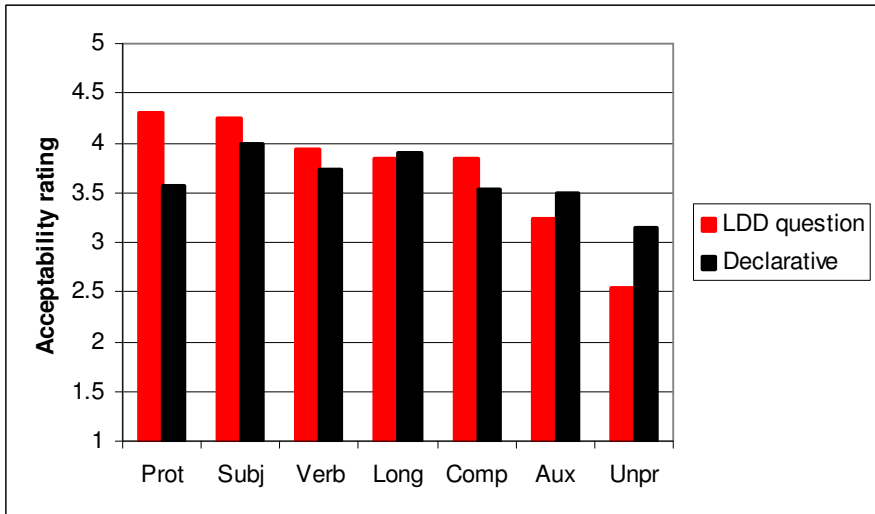
Figure 3. Grammaticality ratings for LDD questions and the corresponding declaratives

Finally, prototypical LDD questions are remembered better than unprototypical ones, by both adults and children. This was demonstrated by an experiment conducted by Dąbrowska, Rowland and Theakston (2009), who asked 5- and 6-year-old children and adults to repeat prototypical and unprototypical questions and declaratives such as those in (10). (To make the task more difficult, the adults were asked to count backwards from 10 to 1 before attempting to repeat the sentence.)

(10) a. *What do you think the funny old man really hopes?* (prototypical LDD question)
   b. *What does the funny old man really hope you think?* (unprototypical LDD question)
   c. *I think the funny old man will really hope so.* (prototypical declarative)
   d. *The funny old man really hopes I will think so.* (unprototypical declarative)

All experimental sentences were 10 words long. For each construction, the prototypical and unprototypical variants were structurally identical and contained the same lexical material. The only difference was that the lexical material which appeared in the main clause in the prototypical variant was in the subordinate clause in the non-prototypical variant, and vice versa.

All three age groups made significantly fewer errors on the prototypical variant of the LDD construction than on the non-prototypical variant. The children also showed prototypicality effects for declaratives. Interestingly, errors often involved transforming the sentence so that it was more like a prototypical instance of the construction, for instance by substituting *think* or *say* for the 'unprototypical' main clause verb or by interchanging the main clause and subordinate clause verbs. For instance, sentence (10b) was sometimes imitated as *what does the funny old man think you think?* or *what does the funny old man think you hope?*

Thus, prototypical variants of LDD questions are clearly easier to recall, presumably because *What do you think S-GAP* and *What did you say S-GAP* are available as chunks. The existence of prototypicality effects for declaratives in children supports earlier proposals by Diessel (2004) and Kidd, Lieven and Tomasello (2006) that children have lexically specific templates for declaratives with verb complement clauses. Although declaratives containing verb complement clauses are also quite formulaic in adult speech (cf. Thompson 2002), they show substantially more variation in the main clause than the corresponding questions (Verhagen 2005; Dąbrowska in preparation); thus, at some (apparently late) point in acquisition learners develop general templates for declaratives but continue to rely on lexically-specific patterns for LDD questions.

These results strongly suggest that adult speakers of English have lexically specific templates which can be used to construct and interpret questions with long-distance dependencies. They do not, of course, rule out the possibility that (at least some) speakers also have more general schemas; however, it is clear that the relatively specific patterns have a privileged status, in that the sentences which match them are easier to process and remember and are perceived as more conventional.

5. Conclusion

The research summarized above provides strong evidence for low-level, 'local' generalizations. Even when the same ending is used with a large

class of words, speakers supply it more reliably with subsets of words sharing certain phonological and/or morphological properties. Speakers are also able to inflect nouns belonging to sparsely populated neighbourhoods, which suggests that they also have access to higher-level generalizations. These, however, are less well entrenched (and hence applied less reliably), and are not necessarily acquired by all speakers – in the Polish dative experiment, for example, 39% of the participants were unable to inflect a single neuter noun from a low-density neighbourhood.

There is also evidence that speakers may rely on low-level generalizations in (at least some areas of) syntax. As we have seen, questions of the form *WH do you think S-GAP* and *WH did you say S-GAP* are produced more fluently, judged to be more acceptable, and remembered better than the non-prototypical variants of the construction. Moreover, in the acceptability judgment task, every departure from the prototype apart from substituting a lexical NP resulted in decrease of acceptability, and changing the main clause subject, auxiliary, and verb and adding an overt complementizer and an additional complement clause resulted in the question being rated as bad as some clearly ungrammatical sentences.

Low-level schemas are wasteful, since we need different schemas for the various special cases instead of a single schema which applies to all relevant exemplars, and less useful than more general patterns, since they are less productive. The fact that speakers nevertheless appear to prefer them to simpler, more general rules suggests that they are computationally less demanding for human brains and easier to acquire. Of course the optimal solution would be to have both, which would allow speakers to apply low-level schemas when they are available, and resort to the more abstract ones when they are not. However, as shown earlier, the higher-level schemas are the dispreferred choice, psychologically less basic, and acquired later, if at all. Thus, the traditional simplicity metric is inappropriate for a cognitive theory of language: mental grammars are highly redundant, and apparently differ from speaker to speaker.

Notes

1. This project was supported by the Arts and Humanties Research Council (grant number AH/F001924/1).
2. There are a few lexical exceptions: about 20 masculine nouns take -*u* rather than -*owi*. These, however, are clearly being replaced by the regular pattern (see Dąbrowska 2008a).

3. Note that all stem endings for high-density neighbourhoods (*-ator, -olog, -ęcie, -isko*, etc.) correspond to highly productive derivational affixes, or combinations of affixes (e.g. *-ar-ka*). This means that any neighbourhood effects found in the experiment could be due to either phonological or morphological factors.

4. Only about 4% of noun tokens and 2% of noun types in the Marysia corpus (which consists of transcripts of a thirty-hour sample of the linguistic experience of a two-year-old Polish girl collected by the author) occur in the dative. However, since nouns are a very large class and are very frequent in text, the absolute frequency figures for datives are still quite high: about 3.5 tokens per hour, which – assuming hours of exposure to language per day – translates into approximately 200 000 tokens over a period of 20 years.

5. These figures are based on the Marysia corpus (see note 4), Otwinowska-Kasztelanic (2000) and a random sample of 200 nouns from the IPI-PAN corpus (available at http://korpus.pl/index.php?lang=en), respectively.

6. Replacing *you* with a proper name in declaratives made the sentence more acceptable, which is clearly a pragmatic effect: it is slightly odd to assert what one's addressee thinks or says.

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Motivating grammatical and conceptual gender agreement in German

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1. Introduction

In the early days of Cognitive Linguistics Ronald Langacker (1991: 290) argued that the dogma of the autonomy of (formal) grammar is founded on a *type/predictability fallacy* that confuses the issues of "what KINDS of linguistic units there are" and "the PREDICTABILITY of their behavior". Full predictability of grammatical structure is obviously not possible; but, in line with Langacker, we contend that much of grammar and "deviation" from grammar is conceptually motivated (see Radden and Panther 2004 for some discussion of the notion of motivation). A grammatical phenomenon that illustrates the age-old controversy over the conceptual motivation of grammar in an exemplary fashion is the category of gender. We touch only briefly on the problem of whether grammatical gender *per se* is a motivated category. Our main focus here is *gender agreement*, in particular, the question as to the circumstances under which the gender of the *target* of an agreement relation is conceptually motivated. Given that in German grammatical gender agreement often competes with conceptual gender agreement, and that the choice of one of the agreement patterns hinges on a variety of complex morphosyntactic, conceptual, and discourse-pragmatic factors, some of our explanations will, by necessity, be rather tentative.

The overall organization of this chapter is as follows: In Section 2, we provide some evidence that gender assignment in the German lexicon is, to a considerable extent, governed by non-arbitrary principles. In Section 3 we discuss gender agreement, concentrating on a group of nouns that denote female humans, such as *Mädchen* 'girl' and *Weib* 'woman', but are grammatically NEUTER. Such nouns, at first sight, seem to defy the claim that grammatical gender is motivated. However, motivation sneaks in through the back door, because these nouns, under certain circumstances, exhibit agreement patterns that are conceptually based. We propose a hierarchy

that relies on an extension of the propositional act categories developed by Searle (1969) and extended by Croft (1990) in the frameworks of speech act theory and linguistic typology, respectively. We suggest that one of the crucial factors influencing gender agreement in German is the *pragmatic function* of the agreement target. The pragmatic functions we suggest are *specifying* (grounding), *modifying*, *predicating*, and *referent-tracking*. Section 4 considers formal factors such as linear distance between controller and target and their impact on agreement. In Section 5 we briefly discuss discourse pragmatic factors that presumably exert some influence on gender agreement. Section 6 summarizes the results and formulates some conclusions.

2.   Grammatical gender: A motivated category

A fairly widespread view among autonomist grammarians is that gender, and in particular, gender in German, is mostly a purely grammatical category, not motivated in any way by conceptual factors. Among the few nouns whose grammatical gender is acknowledged as being determined by the feature SEX (or NATURAL GENDER) are lexemes such as *Mann* 'man' (MASC), *Frau* 'woman' (FEM), *Tante* 'aunt' (FEM), *Onkel* 'uncle' (MASC), *Stier* 'bull' (MASC), *Kuh* 'cow' (FEM), etc. Apart from such rare cases, grammatical gender in German is considered by many to be a totally arbitrary category.

Köpcke and Zubin (e.g. 1996) have shown, however, that much of the German grammatical gender system is conceptually motivated in that certain semantic fields tend to be marked by a specific gender. Here are a few examples that illustrate the point that gender in German is, at least partially, motivated by conceptual factors:

— **Fruit**: mostly FEMININE: *Orange, Birne* 'pear', *Kirsche* 'cherry', *Erdbeere* 'strawberry', *Mango, Papaya, Melone, Kiwi*, etc. (exception: the very frequent noun *Apfel* (MASC)).
— **Beers**: NEUTER (including brand names): *Alt, Dortmunder, Kölsch, Märzen, Radeberger, Weizen, Bit, König* (commercial: "**das** König der Biere"), *Warsteiner, Pils, Löwenbräu, Jever, Holsten, Spaten*, etc.
— **Wines**: MASCULINE: *Riesling, Elbling, Bordeaux, Chardonnay, Müller-Thurgau, Burgunder, Dornfelder, Gewürztraminer, Blaufränkischer,*

Sylvaner, Sauvignon, Muskateller, *Sekt* ('sparkling wine'), *Champagner*, *Crémant*, *Bocksbeutel*, etc.
— ***Soft drinks*** (including brand names): FEMININE: *Brause, Limonade, Bionade, Cola, Afri, Fanta, Pepsi, Sprite*, etc.[1]
— ***Automobiles***: MASCULINE: *Rolls Royce, Mercedes, BMW, Honda, Toyota, VW, Rover, Mini Austin, Fiat, Ford*; *Corolla, Siesta, Tuareg, 300 SL*, etc. .
— ***Motorcycles***: FEMININE: *Harley Davidson*, *BMW, Honda, Kawasaki, Suzuki,* etc.

Especially interesting is a subsystem with nouns ending in the suffix *-mut* whose grammatical gender (MASC vs. FEM) seems to be motivated by the features INTROVERTED and EXTROVERTED, respectively (Zubin and Köpcke 1984):

— "Extroverted": MASCULINE: *Mut* 'courage', *Hochmut* 'arrogance', *Unmut* 'displeasure, resentment', *Wankelmut* 'vacillation', *Wagemut* 'audacity'.
— "Introverted": FEMININE: *Wehmut* 'nostalgia', *Schwermut* 'melancholy', *Anmut*, *Sanftmut* 'gentleness', *Demut* 'humility', *Langmut* 'forbearance'.

However, not every noun in the German lexicon is conceptually motivated. In addition to conceptual motivation one finds *morphological* and *phonological* motivation.[2] Examples of morphological motivation are nouns with the diminutive suffixes *-chen*, *-lein*, which are NEUTER (e.g. *Mädchen* 'girl', *Fräulein*, *Mäuschen* [diminutive form of *Maus* 'mouse']); nouns with the nominalizing suffixes *-ung*, *-heit/-keit*, which are FEMININE (e.g. *Schöpfung* 'creation', *Achtung* 'respect'; *Verschiedenheit* 'difference, dissimilarity', *Einheit* 'unit', *Eitelkeit* 'vanity'). Phonological motivation of grammatical gender in German is exemplified by words beginning with /kn-/, which are mostly MASCULINE, such as *Knall* 'bang' *Knick* 'sharp bend, hedge', *Knast* 'jail', *Knauf* 'knob', *Knopf* 'button', *Knilch* 'bastard', *Knatsch* 'trouble', *Knust* 'crust' (exception: *Knie* 'knee' (NEUTER). Monosyllabic words in /-u:r/ or /-y:r/ are FEMININE: *Uhr* 'watch, clock', *Ruhr* 'dysentery', *Kur* 'cure', *Kür* 'free program', *Tür* 'door', *Schur* 'shearing', *Tour* 'tour, trip'.

3.   A pragmatically based gender agreement hierarchy

Since *conceptual* motivation is not the only source of gender assignment to German nouns and since some of the regularities found by researchers such as Köpcke and Zubin (2003, in press) are tendencies rather than rules, it is not too surprising to find cases in which the grammatical gender of a noun is in potential conflict with its conceptual gender. A non-exhaustive list of such nouns whose grammatical gender clashes with the natural gender of their referent is given below:

— *Grammatically* NEUTER vs. *conceptually* FEMALE: *Mädchen* 'girl', *Fräulein* 'unmarried woman', *Weib* (often derogatorily for) 'woman', *Frauenzimmer* 'woman' (literally 'women's room'), *Luder* 'bitch' *Sternchen* 'starlet', *Pin-up, Model, Girl, Groupie, Starlet* (however: *der Star*), *Centerfold, Video-Chick, Bunny.*
— *Grammatically* MASCULINE vs. *conceptually* FEMALE: *Vamp, Besen* (derogatorily for 'battleaxe'; literally 'broom'), *Hausdrachen* (derogatorily 'dragon'), *Blaustrumpf* 'bluestocking'.
— *Grammatically* FEMININE vs. *conceptually* MALE: *Memme* 'coward', *Tunte* 'homosexual man, queen'.[3]

On the morphosyntactic level, the conflict between grammatical gender and natural gender manifests itself in constructions that require agreement between two linguistic elements. Agreement in a broad sense can be viewed as a relation of dependence between two linguistic units, where one unit requires the occurrence of another unit. An often-cited definition of agreement (see e.g. Corbett 2003), which we adopt here, is found in Steele (1978: 610): "Agreement commonly refers to some systematic covariance between a semantic or formal property of one element and a formal property of another."

    We call the linguistic unit (word, morpheme) that determines the agreement properties of the dependent element *controller* and the dependent unit *target*.[4] Steele's definition explicitly refers to the possibility that agreement may be formal or semantic. We use the terms 'grammatical' and 'conceptual', respectively, for these two kinds of agreement.

    As a first example illustrating the phenomena to be investigated, we quote a text from the German women's magazine *Brigitte* (cited in Zubin and Köpcke n.d.):

(1)   ***Das ehemalige Chanel-Mannequin*** *[NEUT] Inès de la Fressange hat jetzt eine Boutique in Paris eröffnet. [...] Gerade für die Generation der 15- bis 40-Jährigen Französinnen ist **das ehemalige Top-Model** [NEUT] eine Art Referenz- und Identifikationsfigur, weil **sie** [FEM] selbständig, aktiv, erfolgreich, humorvoll, schlagfertig, elegant und glücklich verheiratet ist. Natürlich kennt man **sie** [FEM] als Laufsteg-Repräsentantin des Modehauses Chanel. Aber das allein hätte für **ihren** [FEM] Ruhm nicht genügt. [...] Inès de la Fressange war nicht einfach **ein austauschbares Fotomodell** [NEUT], sondern eigentlich **das erste Mannequin** [NEUT] der 80er Jahre, **das** [NEUT] mit **seiner** [NEUT] starken Persönlichkeit Karriere machte .* (Brigitte 4/92: 46)

'**The former Chanel model** [NEUT] Inès de la Fressange has now opened a boutique in Paris. [...] Especially for the generation of French women between the ages of 15 and 40 **the former top model** [NEUT] is a kind of role model because **she** [FEM] is independent, active, successful, humorous, quick-witted, elegant, and happily married. Of course, **she** [FEM] is well-known as a catwalk representative of the House of Chanel. This fact alone wouldn't have been sufficient to establish **her** [FEM] fame [...]. Inès de la Fressange was not simply an **exchangeable photo model** [NEUT], but **the first model** [NEUT] **who** [NEUT], in the 1980s, created a career based on **her**[NEUT] (lit. its) strong personality.'

The above passage nicely illustrates the contrast between grammatical gender agreement and natural (conceptual) gender agreement in German. The lexical nouns *(Chanel)-Mannequin*, *Top-Model*, and *Fotomodell* belong to an open class of nouns referring to females that are grammatically neuter (notice that many of them are loanwords). The following points, some of which we discuss in more detail later, are noteworthy:

(i)   The model Inès de la Fressange is anaphorically referred to as *sie* ('she'); there is not a single use of the grammatically "correct" pronoun *es* ('it') in this passage. In fact, although the use of *es* seems in principle possible, in the present context, where the model is described by a number of attributes, including the one that she is "happily married", the use of the neuter anaphoric pronoun *es* would be highly infelicitous.

(ii) We find both the possessive pronouns *ihr-* [FEM] and *sein-* [NEUT]; the former agreeing in natural gender with its controller, and the latter exhibiting grammatical agreement.

Note that in the above text the author develops a character portrait of Inès de la Fressange as an endearing *female* human being: she is described as an independent, active, successful, humorous, quick-witted, elegant, and happily married woman. These attributes seem to motivate the use of feminine pronouns.

3.1. Gender agreement vs. metonymic agreement

Before exploring the issue of conceptual gender agreement in more detail, a brief look at a related phenomenon, i.e. *metonymic* agreement, is in order.[5] To see how metonymic agreement compares to conceptual gender agreement consider first the classified ad (2):

(2)   **Gitarre** *gesucht,* **die/*der** *sich nicht zu schade ist, auch mal den Bass in die Hand zu nehmen*. (example from: Egg 2004: 45)
       'Looking for a **guitar** [i.e. player] **who/*which** could stand in as bass.'

In (2) the noun *Gitarre* 'guitar' metonymically refers to 'guitar player'. At least in German, the adjacent relative pronoun agrees with the grammatical gender of the metonymic source *Gitarre* rather than with the metonymic target meaning 'guitar player'. Figure 1 diagrams this configuration.

'Looking for a **guitar who** would occasionally stand in as bass'
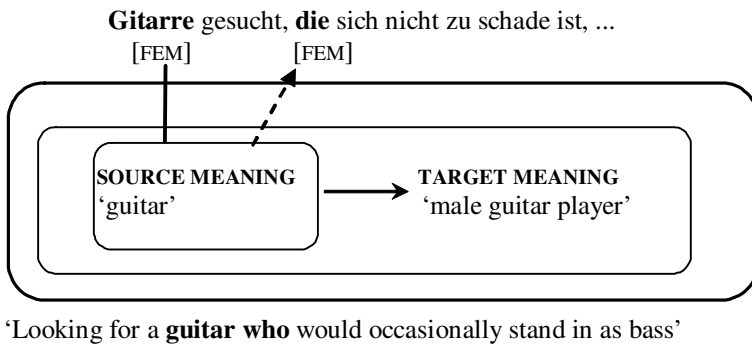
Figure 1. Source induced metonymic agreement.

Suppose that it is clear from the context that the bandleader is looking for a male guitarist. The metonymic target meaning of *Gitarre* would thus be 'male guitar player'. It is not acceptable to use the masculine relative pronoun *der* in this case. It would however be possible (and even obligatory) in the subsequent discourse to refer to the intended metonymic referent 'male guitar player' by means of the personal pronoun *er* 'he'. Consider a continuation of (2) along the lines of (3):

(3)   ***Gitarre** gesucht,* **die** [FEM]/*****der** [MASC] *sich nicht zu schade ist, auch mal den Bass in die Hand zu nehmen.* **Er** [MASC] *sollte auch Schlagzeug spielen können.*
'Looking for a **guitar** [i.e. player] **who/*which** could stand in as bass. **He** should also be able to play the drums.'

Consider next a case where the anaphoric pronoun agrees with the metonymic target of the metonymic vehicle:

(4)   *Die* **erste Geige** [FEM] *hat leider gestern nach dem Konzert* **seine** [MASC] *Partitur vergessen.*
'The **first violin** unfortunately forgot **his** score yesterday after the concert.'

In (4) it is obviously the *conceptual gender* of the metonymic target 'male first violinist' that determines the grammatical gender of the possessive pronoun. This case is represented in Figure 2.

Die *erste Geige* hat leider gestern nach dem Konzert **seine** Partitur vergessen
[FEM]   [MASC]

| SOURCE MEANING | → | TARGET MEANING |
| 'first violin' | | 'male first violinist' |
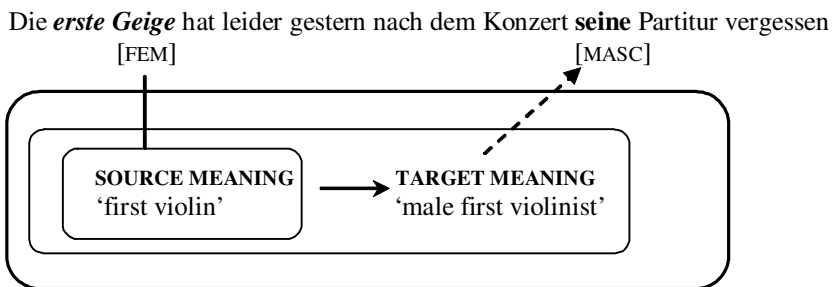
'**The first violin** unfortunately forgot **his** score after the concert yesterday'

Figure 2. Target induced metonymic agreement

To conclude, there are some parallelisms between gender agreement and metonymic agreement. As we have seen in examples (3) and (4), metonymic agreement can involve gender: the pronoun agrees with the grammatical gender of the metonymic vehicle (source) or with the (natural) gender of the metonymic target. There is however a *crucial* difference between the metonymic cases and cases of conceptual gender agreement as exemplified in (1). The difference is that conceptual gender agreement does not involve a shift in reference. To see this, consider (5), which is an excerpt from a very popular television broadcast in the 1990s ("Das literarische Quartett") where new works of fiction were discussed by four journalists and literary critics:

(5)   Darf ich die Geschichte von **dem kleinen Mädchen**, **das** mit **ihrem** Vater nach Venedig geht, als Beispiel nehmen?
       'May I take as an example the story of **the little girl who** [NEUT] travels to Venice with **her** father?'
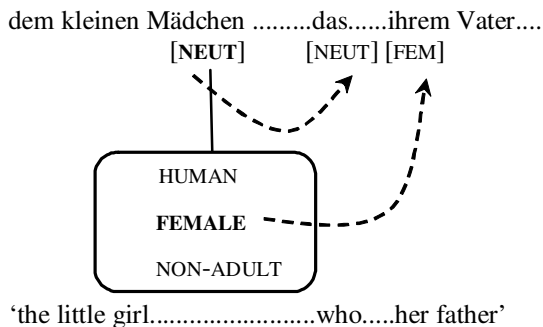
Figure 3. Conceptual gender agreement.

As can be seen from Figure 3, the relation between the controller *Mädchen* and the possessive pronoun *ihrem* is a clear example of conceptual gender agreement. The referent of the noun phrase *dem kleinen Mädchen* is not shifted but remains constant. In fact, the speaker of (5) could also have chosen the neuter possessive pronoun *seinem* (grammatical gender agreement) instead of *ihrem* (conceptual gender agreement). Note that the relative pronoun *das* in (5) agrees grammatically with *Mädchen*. We will discuss the gender agreement behaviour of pronouns in more detail in Section 4.

3.2. An Agreement Hierarchy for gender agreement?

The data for German are basically consistent with the Agreement Hierarchy proposed by Corbett in various publications (e.g. 1991, 2003, 2006). For our purposes it is sufficient to present the agreement hierarchy assumed by Corbett (2003: 115), which is represented in Figure 4.

attributive	predicate	relative pronoun	personal pronoun

$\longrightarrow$

grammatical agreement   conceptual agreement
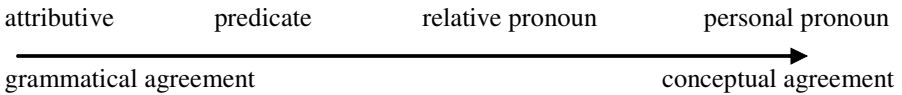
Figure 4. Corbett's gender agreement hierarchy.

This hierarchy is supposed to represent general tendencies in the world's languages to code the target on a conceptual basis: "For any controller that permits alternative agreement forms, as we move rightwards along the Agreement Hierarchy, the likelihood of agreement with greater semantic justification will increase monotonically (that is, with no intervening decrease)" (Corbett 2003: 115).

We claim that Corbett's hierarchy can be reinterpreted as a scale of *pragmatic functions*. The advantage of this reinterpretation is that Corbett's hierarchy, which is purely descriptive, can be simplified and possibly gain in explanatory power. As is well known, philosophers of language such as Searle (1969) distinguish between illocutionary acts and propositional acts, the latter being subdivided into *referring* and *predicating acts*. Croft (1990: 248) provides good reasons to add to these categories the act of *modifying*. We suggest that a fourth category should be acknowledged, viz. the act of *specifying*, which is comparable to what Langacker (2000: 22 et passim) calls *grounding*. This conceptually-pragmatically based agreement hierarchy is represented in Figure 5:

specifying	modifying	predicating	referent-tracking

$\longrightarrow$

grammatical   conceptual
agreement   agreement
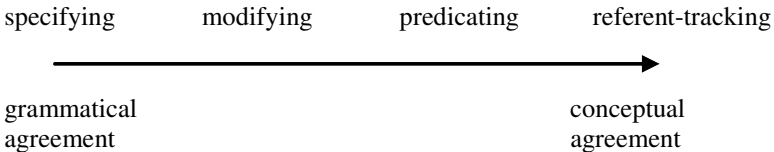
Figure 5. A pragmatically based agreement hierarchy.

Our basic hypothesis is the following: The more *referential* the target, the more likely conceptual agreement will occur.[6] Following Croft (1990), we consider noun phrases to be the vehicles of reference. In this section, we show how the pragmatically-based agreement hierarchy (Figure 5) applies to gender agreement in German.

The act of *specifying* is typically associated with the grammatical category of determiners. We assume that determiners do not have a referring function *per se*, but that they are essential components in the process of referent identification. Determiners are the elements most resistant to conceptual agreement, i.e., the following noun phrases are virtually excluded: *die* [FEM] *Mädchen* [NEUT] */ Weib / Mannequin / Model,* etc.

Modifying elements (e.g. adjectival, participial modifiers) usually also show grammatical gender agreement:

(6)   a.   *ein klein-es Mädchen*
           [NEUT] [NEUT] [NEUT]
           'a little girl'

      b.   *ein klein-e Mädchen*
           [NEUT][FEM][NEUT]

As far as *predicational* elements are concerned, no specifications of gender occur in the *verbal* component of the predicate – hence the question of gender agreement does not arise. Also, there is no gender agreement between the controller (e.g. subject) and the predicate *adjective* in German since the adjective remains invariant in these cases:

(7)   *Die Frau / das Mädchen / der Mann ist intelligent.*
      'The woman/the girl/the man is intelligent.'

In German, the issue of predicational agreement can only arise with predicate *nominals*. For example, a sentence like

(8)   a.   *Die Frau*   *ist*   *Ärzt-in.*
           The woman.FEM   is   doctor-FEM
           'The woman is a female doctor.'

is better than

b. *?Die Frau   ist   Arzt.*
   The woman.FEM   is   doctor.MASC
   'The woman is a doctor.'

The higher degree of acceptability of (8a) over (8b) is probably due to a tendency in present-day German to specify the natural gender of human referents, especially when the noun denotes a profession. In fact, it is plausible to assume that the agreement pattern in cases like (8a) is socioculturally motivated – here with the emancipation of women in German society.

When the subject contains a noun whose grammatical gender is in conflict with its conceptual gender, as in

(9)   *Das Mädchen   ist Studentin   der   Medizin.*
       The girl.NEUT   is student-FEM of.the medicine
       'The girl is a medical student.',

the natural gender FEMALE of the controller *das Mädchen* is most likely to determine the grammatical gender FEMININE of the predicate nominal (conceptual gender agreement). In many cases, the question of agreement between the subject and the predicate nominal does not even arise – e.g. when the predicate nominal is not semantically specified according to gender:

(10)   *Seine Freundin / der Junge /* d*as Mädchen ist Lehrling bei BMW.*
       His girlfriend.FEM / the boy.MASC / the girl.NEUT is apprentice.MASC
       with BMW

The propositional act category that is most amenable to conceptual gender agreement in comparison to specification, modification and predication is the *referent-tracking* function, which is essential for identifying referents in discourse. The referent-tracking elements we are going to discuss are *relative pronouns*, *possessive pronouns*, and *personal pronouns*. As an example of conceptually-based pronominal coreference, consider:

(11)   *In diese traurige Geschichte von dem kleinen Mädchen* [NEUT] *und ihrem* [FEM] *Vater kommt auch noch die Szenerie Venedig, morbid, schwankend.* (*Literarisches Quartett*, 13/05/1993)
       'In the sad story about a little girl [NEUT] and her [FEM] father there also appears the scenery of Venice, morbid and vacillating.'

That personal pronouns are referent-tracking devices is obvious and needs no further justification. Possessive pronouns are a hybrid category. On the one hand, they can be likened to determiners, which have a specifying function. On the other hand, they are clearly also referent-tracking devices, as can be seen in utterance (11), where *Mädchen* 'girl' and the dative form *ihrem* 'her' refer to the same person – a case of conceptual gender agreement. We treat relative pronouns also as referent-tracking devices that either grammatically or conceptually agree with their controller, i.e., a noun phrase located in the matrix clause. We will show that personal pronouns and possessives have a stronger tendency to exhibit conceptual agreement patterns than relative pronouns (see *Figure 6*).

Figure 6. The referent-tracking hierarchy.

4.   Formal constraints on gender agreement

We propose that the pragmatic functions of *specifying, modifying*, *predicating*, and *referent-tracking* interact in ways that are poorly understood at present with *formal constraints* of the following kind:

(12) a. the *linear distance* between the controller and the target;
     b. the respective *syntactic domains* of controller and target; and
     c. the *grammatical category* and/or *function* of the target; and its degree of *syntactic embeddedness* relative to the controller.

As pointed out above, the focus of our study is on referent-tracking devices and their agreement behaviour. We deal only briefly with the other pragmatic functions. Suffice it to say that linear distance seems to exert an influence on the agreement patterns of specifiers, modifiers, and predicational elements. In the case of specification and modification, the linear distance between controller and target is usually very small, and grammatical

agreement is therefore the most likely option. With predication the distance between controller and target is typically greater than with specification and modification. One would therefore expect a stronger tendency towards conceptual agreement. As we have seen above, the existence of agreement between the subject and a predicative element is rather restricted in German, and predicative adjectives show no agreement morphology at all in this language. However, agreement between the subject and the predicative adjective is obligatory in Slavic (Wechsler and Zlatic 2003) and Romance languages (Corbett 2003, 2006), and it is in these languages that cases of conceptual agreement can be found, although they are probably not always tolerated by normative grammarians. In what follows we focus mostly on the agreement patterns of targets that have a referent-tracking function.

4.1. The Linear Distance Principle

The Linear Distance Principle can be stated as follows:

(13)   The target is more likely to exhibit conceptual gender agreement as its distance from the controller increases.

Consider the following authentic example that contains two coordinated relative clauses:

(14)   *Und er liebt Henriette Vogel, **das Mädchen**, **das** in derselben Nacht wie er geboren wurde und **die** mit ihm im Bordell aufwächst.*(<www.kaspar-hauser-buchladen.de>)
‘And he loved Henriette Vogel, the girl [NEUT] who [NEUT] was born the same night as he was and who [FEM] grew up with him in a brothel’

In the first relative clause, in which the controller *das Mädchen* immediately precedes the relative pronoun *das,* grammatical agreement is virtually obligatory. However, since the distance between the controller and the relative pronoun in the second clause has increased, conceptual agreement (*die*) becomes quite natural. In general, as Köpcke and Zubin (in press) have shown, growing distance between controller and target correlates with an increasing tendency to use conceptual agreement (see Figure 7).
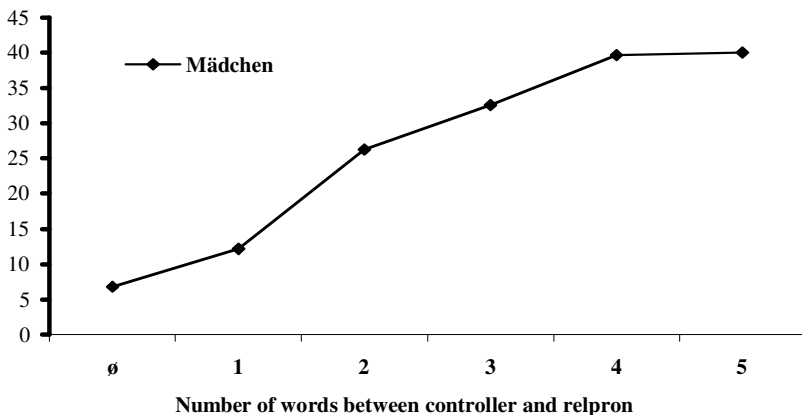
Figure 7. Grammatical vs. conceptual agreement as a function of the distance be-
tween controller and target (relative pronoun).

Another set of examples that demonstrates the relevance of the Linear Dis-
tance Principle is given in (15a–c), see Zubin and Köpcke (in press):

(15) a. *Eines/*eine der Mädchen liegt im Krankenhaus.* (1.4%)
         'One [NEUT]/*one [FEM] of the girls is in the hospital'
     b. *Eines/*eine der beiden Mädchen liegt im Krankenhaus*. (6.8%)
         'One [NEUT]/*one [FEM] of the two girls is in the hospital.'
     c. *Eines/eine der beiden schwer verletzten Mädchen liegt im Kran-
         kenhaus*. (32.9%)
         'One [NEUT]/*one [FEM] of the two badly injured girls is in the
         hospital.'

The percentages in parentheses are based on Google counts of the neuter
noun *Mädchen,* conducted by Zubin and Köpcke (in press). Examples
(15a–c) strongly suggest that the grammaticality of the feminine form of
the quantifier *ein-* is a function of the amount of intervening lexical mate-
rial between the quantifier and *Mädchen*. In (15a) the lexical gender of
Mädchen (neuter) strongly induces the occurrence of the neuter quantifier
eines. The more distant the controlling element is from the target, the more
likely speakers will resort to conceptual gender agreement. This can be
seen in (15b), and even more so in (15c), where 6,8% and 32,9%, respec-
tively, of the data show the selection of the feminine form.

Let us finally quote an example of the frequently observable conceptual gender agreement patterns involving personal pronouns:

(16)   *Er fasse **das Mädchen** und zog **es** mit sich ins Wasser. Erschreckt und vor Angst schrie **sie** auf und rief um Hilfe.* (<www.hekaya.de /txt.hx/ahewauwen-und-das-maedchen--maerchen--suedamerika>)
       'He grabbed the girl [NEUT] and pulled her [NEUT] with him into the water. Terrified and frightened, she [FEM] screamed and shouted for help.'

In conclusion, the choice of the target in sentences (14) and (16) is a function of the distance between controller and target. In general, the greater the linear distance, the more acceptable (and even natural) conceptual gender agreement becomes.

4.2. Syntactic Domain Principle

Linear distance is obviously a very important factor that has an impact on gender agreement. The influence of syntactic factors, in particular what we call the *Syntactic Domain Principle* and the *Principle of Syntactic Embeddedness*, are of a more speculative nature. Nevertheless, there are some indications that syntactic structure plays a role in the selection of agreement markers.

Syntactic Domain Principle

(17)   If controller and target are dominated by the same phrasal node, grammatical agreement tends to be preferred over conceptual agreement. If however, controller and controllee are dominated by distinct phrasal nodes, conceptual agreement becomes more likely. Conceptual agreement is most likely when controller and controllee occur in different coordinated clauses or even in different sentences of a discourse. This principle competes with the *Linear Distance Principle* and the *Principle of Syntactic Embeddedness*.

Consider the following example:

(18)   *Der junge Mann sah in der Straßenbahn das berühmte Fotomodell* [NEUT]. *Sie* [FEM] *lächelte ihn an.*

> 'On the tram, the young man noticed the famous fashion model [NEUT]. She [FEM] smiled at him.'

In (18) the controller *Fotomodell* immediately precedes the pronominal target *sie*. The Linear Distance Principle would predict grammatical gender agreement in this case, i.e. the neuter pronoun *es*. However, conceptual gender agreement is perfectly natural. We surmise that the occurrence of controller and target in two different syntactic domains, here in two distinct sentences, cancel the effect of the Linear Distance Principle.

The existence of the Syntactic Domain Principle is as yet not sufficiently supported. However, it is clear that linear distance cannot be the only factor determining the choice of the type of agreement. Zubin and Köpcke (n.d.) conducted a corpus study (Google search) with examples where the controller *das Mädchen* is separated by at most one word from its target (pronominal pronoun). They found that, despite the close distance between controller and target, there is a strong preference (almost 90%) for conceptual agreement over grammatical agreement in naturally occurring discourse.

4.3. Principle of Syntactic Embeddedness

In Section 4.1, in connection with sentences like (14), we claimed that relative pronouns that immediately follow their controller usually show grammatical agreement. Increasing distance from the controller enhances the likelihood of conceptual agreement. The Principle of Linear Distance thus predicts that (19) would be preferred to (20). The possessive relative pronoun in (19) is immediately adjacent to the controller *Mädchen*. Therefore one would expect the grammatically agreeing form *dessen* in the relative clause. However, sentences such as (20), which are frequently used in German, even in written discourse, exhibit conceptual agreement, despite the fact that the pronoun immediately follows its controller. This fact cannot be accounted for by the Linear Distance Principle.

(19)   ***Das Mädchen*** [NEUT]***, dessen*** [NEUT] *Mutter auf der anderen Straßenseite gestanden hatte, war vom Außenspiegel des PKW erfasst worden.* (*Tagesspiegel*, 12/09/2000)
       '**The girl** [NEUT] **whose** [NEUT] mother had been standing on the other side of the street had been hit by the outside mirror of the car.'

(20)   ***Das Mädchen*** [NEUT], ***deren*** [FEM] *Leben nach Auskunft **ihrer** [FEM]
       Ärzte nur mit einer Operation in Deutschland gerettet werden kann,
       soll in der Göttinger Uniklinik untersucht und behandelt werden.*
       (*Berliner Zeitung*, 03/08/1995)
       '**The girl** [NEUT] **whose** [NEUT] life, according to her doctors, can
       only be saved only by means of surgery in Germany ...'

We tentatively suggest a second syntactic principle, which we call the
Principle of Syntactic Embeddedness, to account for cases like (20). It can
be formulated as follows:
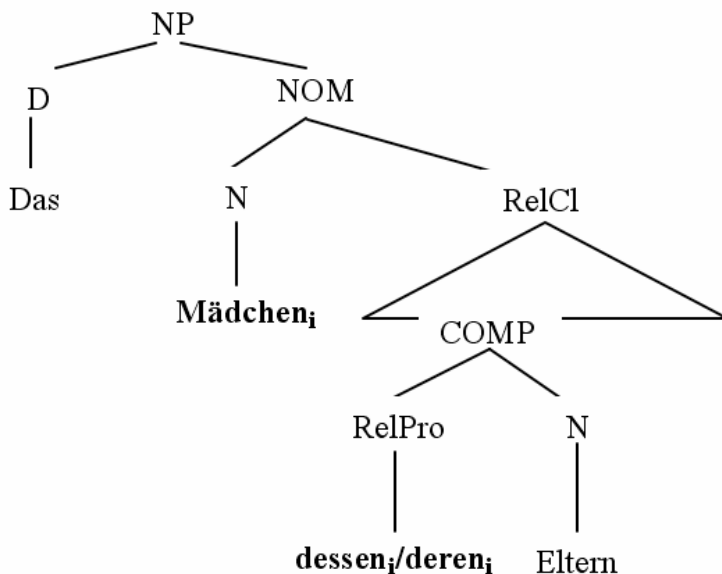
(21)   The more embedded the target is relative to the controller, the more
       likely conceptual agreement will occur.

The principle can best be illustrated by contrasting the syntactic structures
of the minimal pair *das Mädchen, das/*die...* 'the girl who…' vs. *das Mäd-
chen, dessen/deren…* 'the girl whose…', which are syntactically dia-
grammed in (22) and (23), respectively.

(22)
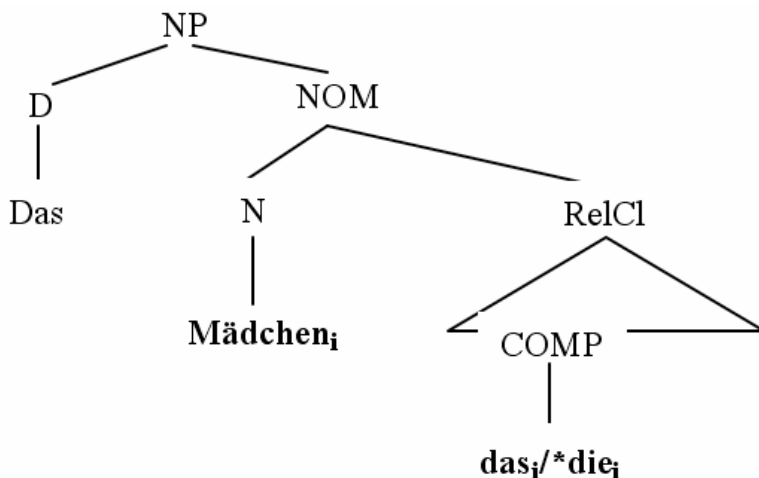
(23)

As can be seen from a comparison of the tree structures in (22) and (23), the relative pronouns *dessen/deren* in (22) are more deeply embedded relative to their controller *Mädchen* than *das/*die* in (21). The embeddedness hypothesis is consistent with quantitative data we have collected from the *Digitales Wörterbuch der Deutschen Sprache* (DWDS), which contains a subcorpus of online texts from the newspaper *Berliner Zeitung*, dating from March 1, 1994 through December 31, 2005. The size of the corpus is 252 million word forms and can be considered to be fairly representative of contemporary written German usage in the print media. Our aim was to find out

(i)   to what extent the frequencies of relative pronouns are dependent on their syntactic function within the relative clause, and

(ii)   more importantly, whether there is any correlation between the syntactic function of the relative pronoun and the type of agreement (grammatical vs. conceptual) between the controller and the pronoun.

As the controller of the relative pronoun we chose the noun *Mädchen* and considered only cases where the pronoun is immediately adjacent to its controller. The results of this investigation are given in Table 1.

Table 1. Distribution of relative pronouns according to syntactic function and agreement patterns.

Relative pronoun	GramAgr N	GramAgr %	ConcAgr N	ConcAgr %	TOTAL N	TOTAL %
Subj.	654	99.7%	2	0.30%	656	86.7%
Direct Obj.	45	100%	0	0%	45	5.9%
Ind. Obj.	18	100%	0	0%	18	2.5%
Possessive	27	73%	10	27%	37	4.9%
TOTAL	744	98.4%	12	1.6%	756	100%

Table 1 shows that the overwhelming majority of relative pronouns are subjects (86,7%). Direct objects, indirect objects and possessive relative pronouns are rare.[7] What is interesting for our purposes is the distribution of relative pronouns in terms of grammatical and conceptual agreement. The pronouns with the syntactic functions Subject, Direct Object, and Indirect Object hardly ever exhibit conceptual agreement. However, interestingly, in our corpus almost 30% of the tokens of possessive relative pronouns exhibit conceptual agreement with the controller *Mädchen* (i.e. *deren N* instead of *dessen N*). Since the linear distance between controller and target is zero for all relative pronouns, we surmise that the crucial factor determining the propensity of possessive relative pronouns towards conceptual gender agreement might be their higher degree of embeddedness relative to their controller.

5. Discourse factors

As can be seen from Table 1 above, only two subject relative pronouns, i.e. a mere 0,3%, show conceptual agreement with the controller. One example is given in (24):

(24)   *Eigentlich war seine Reise nach Amerika auch eine Flucht **vor einem Mädchen*** [NEUT], ***die*** [FEM] *ihn zu schnell und zu heftig erobert hat.*
'In reality, his trip to America was an escape from a girl who [FEM] had conquered him too fast and too vehemently.'
(*Berliner Zeitung*, 11/11/2001)

Sentence (24) violates the Linear Distance Principle, which would predict the occurrence of the neuter relative pronoun *das*. Nevertheless, conceptual agreement seems completely natural in this case. None of the principles that we have discussed so far is capable of accounting for this example. We have no definitive solution for data like the above, but we tentatively suggest that the naturalness of *die* in (24) is related to the fact that its controller differs very markedly in its syntactic function (prepositional object) from that of the target (subject). We assume that the cognitive effort needed to process examples of the kind of (24) is greater than in cases that involve identity or, at least, similarity between the syntactic relations coded by the controller and its target. The disparity of the syntactic relations frequently signals a shift in discourse perspective, and it is this shift that might lead language users to a conceptual resolution of the agreement problem.

Furthermore, another factor that we briefly touched upon in connection with our textual example (1) appears to be relevant here. (24) is part of a narrative about a sexual relationship, a context that contributes to a reading of the girl as female, which additionally motivates the selection of the feminine pronoun *die*.

A particularly compelling example of this type of conceptualization of a young female is the following narrative text from Wolfgang Koeppen's novel *Tauben im Gras* (English translation: *Pigeons on the Grass*).

(25)   *Was für ein junger Kerl er ist, was für ein junger Ami, dachte **das Fräulein**, es ist sein erster Abend in Deutschland, und schon habe ich ihn kennengelernt. **Das Fräulein** war hübsch. **Es** hatte dunkle Locken und blanke Zähne. **Das Fräulein** hatte sich von Richard in der Hauptstraße ansprechen lassen. **Es** hatte gesehen, daß Richard Lust hatte, **ein Mädchen** anzusprechen, und daß er zu schüchtern war, es zu tun. **Das Fräulein** hatte es Richard leichtgemacht.[...] Richard merkte, daß **sie** es ihm leichtmachte. **Sie** gefiel ihm, aber er dachte, wenn **sie** nun krank ist? Man hatte ihn in Amerika gewarnt. [...] Aber er dachte, ich will ja gar nichts von **ihr**, und vielleicht ist*

sie auch gar nicht krank. **Sie** war nicht krank. **Sie** war auch kein Straßenmädchen. Richard hatte Glück gehabt.

'What a nice young guy he is, this young American, thought *the young woman* [NEUT]. It's his first evening in Germany, and I have already made his acquaintance. *The young woman* [NEUT] was pretty. *She* [NEUT] had dark curls and pearly teeth. *The young woman* [NEUT] had been chatted up by Richard on the main street. *She* [NEUT] had been aware that Richard was keen on chatting up a girl [NEUT] but he was too shy to do so. [...] Richard noticed that she [FEM] made it easy for him. He liked her [FEM], but was worried that she [FEM] might be not be healthy. He had been warned in America. [...]But he thought that he didn't want anything from her [FEM]; and perhaps she [FEM] didn't have any disease. She [FEM] did not have any disease. She [FEM] was not a prostitute either. Richard was lucky.'

As long as the young woman is described from an auctorial perspective, grammatical agreement, i.e. NEUTER, is chosen by the author. As soon as the perspective of the figure Richard is taken and his erotic attraction towards the young woman is described, the target pronouns switch to conceptual agreement, i.e. FEMININE. In this novel, Koeppen exploits the agreement options available in German in a highly artful way.

6.   Conclusion

In this chapter we have argued that the agreement patterns of neuter nouns denoting females are sensitive to a hierarchy of pragmatic act functions that we have called specifying (grounding of reference), modifying, predicating, and referent-tracking. Conceptual gender agreement occurs most frequently with referent-tracking targets. We have focused on this last category and have demonstrated that additional formal factors play an important role in the assignment of agreement patterns. We identified factors such as the linear distance between controller and target, their respective syntactic domains, the word class of the target, and the degree of syntactic embeddedness of the target relative to its controller. Finally, quoting a passage from a literary text, we suggested that the agreement pattern is also determined by discourse pragmatic parameters, such as the narrative context and the conceptualization of the female protagonist.

Notes

1. Hans-Jörg Schmid has pointed out to us that in Southern German the grammatical gender of soft drinks like Cola, Sprite, and Fanta is neuter.
2. Köpcke (1982) investigates the phonological motivation of monosyllabic nouns in German in some detail.
3. Susanne Handl has drawn our attention to examples of this kind.
4. This is also the terminology used by Corbett (2006).
5. On the notion of metonymy as a conceptual relation see e.g. Panther (2005) and Panther and Thornburg (2007).
6. A terminological clarification is perhaps in order here. The term *reference* in its broadest sense is often used for 'denotation', i.e. for the relation between linguistic expressions and what they stand for in 'reality'. What we have in mind here is a more restricted use of the term *reference* – approximately in the sense of Searle's notion of 'referring act'.
7. From a typological perspective, Comrie (1981:148–153) points out that languages differ in the availability of syntactic positions (functions) for relativization. German and English allow all four positions listed in Table 1 to be relativized, whereas, according to Comrie (1981: 149), a language like Malagasy allows only the subject position to be relativized. The subject relative pronoun seems to have a privileged status in German too since, as *Table 1* shows, it is by far the most frequently occurring option in authentic discourse.

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Computed or entrenched? The French *imparfait de politesse*

Ulrich Detges

1. The imparfait de politesse

In French, as in many other languages, past-tense forms of the type *je voulais vous poser une question* 'I wanted to ask you a question' can be used to express politeness. In this paper, I want to address a simple question: are these forms instances of the "normal" past tense, from which the politeness effect is somehow derived *ad hoc* by the speakers, or is politeness a separate, entrenched value of the past-tense forms in question? As we shall see, this problem touches on fundamental issues of synchronic and diachronic linguistics.

2. Polysemy, monosemy, synchrony, and diachrony

The question of how linguistic meaning is stored and processed in the mental lexicon is a much-debated issue. With respect to this question, at least two opposing positions can be identified, which I will refer to in the following as *monosemy* and *polysemy*. According to the monosemy view, the meaning of a given linguistic item is not directly observable – what is observable in actual communication are superficial context effects. According to this hypothesis, these effects are all derived from a single underlying invariant meaning which is usually conceived of as a set of highly abstract features. When the item in question is used in actual communication, this basic meaning is enriched, according to the monosemy hypothesis, by contextual and encyclopaedic information of various kinds so as to yield the observable surface effect. In Figure 1, these surface effects are referred to as *usages*. The (synchronic) computational process by which these usages are derived from the basic meaning is sometimes called pragmatic *enrichment* in the more recent literature (Saussure and Sthioul 2005). The advantage of monosemic models is their descriptive economy (Hansen 1998b: 240). The semantic component is reduced, sometimes in an elegant fashion,

to an indispensable minimum, while the main burden of computing the observable surface effects lies on the pragmatic module (Waltereit 2006: 147).
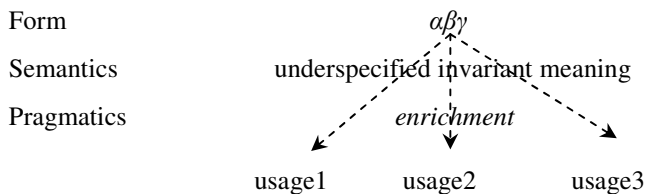
Form	*αβγ*
Semantics	underspecified invariant meaning
Pragmatics	*enrichment*

usage1   usage2   usage3

Figure 1. The monosemy model

Despite the central role played by pragmatic enrichment in this model, monosemy approaches have little to say about the nature of the computational operations involved.

An alternative way to conceive of meaning processing is the polysemy approach. According to polysemy models[1] linguistic items generally have more than one meaning. Consequently, these meanings are less abstract than are the semantic invariants of the monosemy model, and they are much closer to the observable surface effects. Furthermore, meanings are viewed as conventional and stable units which are not derived from one another, at least not in synchrony. This does not mean, however, that meanings are prepackaged "container-like entities" (as has been objected by Zawada 2005: 139–142). They can be contextually enriched when used in actual communication, thereby yielding usages. According to the polysemy model which I would like to develop here (see also Waltereit and Detges 2007: 63–64), pragmatic *enrichment* – that is, *inference* (on the hearer's side) and *implicature* or *invited inference* (on the side of the speaker) – consists of a small set of highly constrained operations.
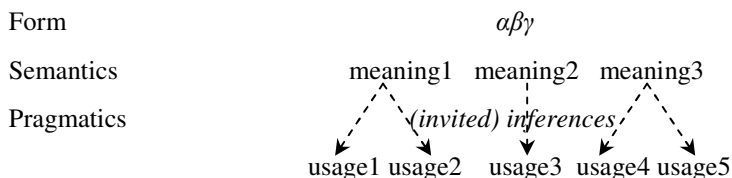
Form	*αβγ*
Semantics	meaning1 meaning2 meaning3
Pragmatics	*(invited) inferences*

usage1 usage2   usage3 usage4 usage5

Figure 2. The polysemy model

Even though the various meanings of a given item are not derived synchronically from each other, they are linked by associative relations. To understand this, one has to keep in mind Bréal's (1899) famous formula according to which polysemy is the synchrony of language change. As a simple case in point, take Old French *chief,* which originally meant 'head' but which, as a consequence of a diachronic change, also acquired the meaning 'chief, leader' (see Rey et al. 1992, s.v. "chef").

The diachronic change from *chief* 'head' to *chief* 'leader' started when certain speakers would exceptionally use the word *chief* 'head' in such a way as to invite the inference that what they really meant was a LEADER. At this stage, 'leader' is still a mere usage of the lexical item *chief*, and it is computationally derived from the latter's meaning 'head'. The cognitive operation by which this is achieved is, in this case, metaphor. Later, more and more speakers use the word *chief* to refer to LEADERS, until finally, the erstwhile usage becomes lexicalized, i.e., entrenched by high frequency, thereby turning it into a new conventional meaning of the item *chief*. As a consequence of this, 'leader' is stored in the speakers' minds as an autonomous semantic unit, which, even though it is referred to by the same form as the unit 'head', is no longer derived from the latter. From this moment onwards, the old meaning and the new one exist independently side by side. However, the mechanism of change which, on the diachronic level, led to the emergence of 'leader' from 'head' (i.e., metaphor) is synchronically still accessible. To the speakers it is intuitively clear why the concept of the LEADER should be referred to by the same form as the concept of HEAD, given the metaphorical similarity of both referent types. This will be referred to in the following as *motivation*. Synchronically, polysemy is a motivated network of independent, stable meanings attached to the same form and linked to one another by associative relations, which are reminiscent of the mechanisms of change which brought them about.[2] That meanings are in principle independent from one another can be gleaned from the diachronic evolution of Old French *chief.* Its older meaning 'head' disappeared (because *chief* 'head' was replaced by *tête* 'head'), but this change did not affect *chief* 'leader' which persists up to today. This shows that the meaning 'leader', as a consequence of its eventual conventionalization, was not derived from 'head' (as a monosemic approach would be forced to argue).

(1)   Ofr. *chief* a. 'head' $_{metaph}$> 'leader'   diachrony
                      b. 'head' $_{-metaph-}$ 'leader'   synchrony 1 (Old French)
                      c.   ø   'leader'   synchrony 2 (Mod. French)

If, for some reason, the motivation relation between the meanings assembled in a given polysemy network fades out, polysemy may give way to *split*, i.e., the previously polysemous word or form will be intuited as two (or more) distinct, semantically unrelated words or forms. This is the case for French *voler₁* 'to fly' and *voler₂* 'to steal', which are homonyms in Modern French. Both verbs go back to Latin *volare* 'to fly', and their meanings were once part of a single network of one polysemous verb *voler* 1. 'to fly', 2. '(for predatory birds) to prey on smaller animals', and 3. 'to steal'. This network broke apart when the intermediary meaning 'to prey on smaller animals' fell out of usage (see Blank 2001: 112), leaving behind the mutually inaccessible meanings 'to fly' and 'to steal'.

> Old French: Polysemy
> > Form   *voler*
> > Meanings   'to fly' ---- '(predatory birds) to prey' ---- 'to steal'
>
> Modern French: Homonymy
> > Forms   *voler₁*   *voler₂*
> > Meanings   'to fly'   'to steal'

Figure 3. Split

From these simple examples, the following three properties of meanings (as opposed to usages) can be deduced.

— Meanings are synchronically stable, conventionally given objects.
— From a diachronic perspective, meanings are former usages which have become entrenched by high frequency.
— Even though meanings are synchronically underived, they are organized in polysemy networks – if this is possible – where they entertain motivated relations to other meanings coded by the same form.

From these observations, a hypothesis can be deduced concerning the computational mechanisms of enrichment. Since, according to the polysemy model just sketched, new meanings evolve out of former usages, it follows that the cognitive operations by which usages are derived from meanings must be the same as the ones which are known to be the cognitive mechanisms of semantic change (which, again, correspond to the associative relations observable in polysemy networks), namely (mostly) metonymy, but

also metaphorical and taxonomic transfers (Blank 2001: 104–108; Zawada 2005: 130–132).

It is obvious that the monosemy model will find it difficult to accommodate for language change, since all the meanings attached to a form, in (1) 'head' and 'leader', must be licensed by the invariant basic meaning. If they are not, then they cannot be realized as usages. However, if they cannot be realized as usages, then it is hard to understand how and why they came into being in the first place (Hansen 1998a: 87).

Despite its apparent advantages, the polysemy model, too, presents certain problematic aspects. Thus, the theoretical distinction between meanings and usages raises the question of how both can be empirically distinguished from one another. The methodological solution I want to propose in this paper is, once again, a look at language change, and more specifically at diachronic corpus data. If meanings can be distinguished from usages by the fact that they are entrenched objects, then they may be identified in corpora by a relatively high frequency rate which is constant over time. Moreover, if meanings are conventional, then they are historical objects, that is, they have an identifiable beginning in time (and possibly also an end).

In the following case study, this methodological approach will be exemplified by a look at the *imparfait de politesse* in Modern French.

3. The French *imparfait* and the *imparfait de politesse*

Among the various grammatical markers used for past-tense reference in French, the *imparfait* certainly is the one which has been most discussed in the literature. This marker expresses a wide range of temporal and modal values (for a complete list, see Labeau 2002). Among other things, it can refer to imperfective past events (2), to the future of the past (3) and to irrealis mood (4).[3]

(2)   *Hier je **travaillais**$_{IMP}$* (cf. Labeau 2002: 158)
        'Yesterday I **was working***'
(3)   *Jean arriva à la gare. Le train **partait**$_{IMP}$ dans 20 minutes.*
        'John arrived at the station. The train **was going to leave** in 20 minutes.'
(4)   *Si j'**étais**$_{IMP}$ le Père Noël ….*
        'If I **was** Santa Claus …'

Moreover, the *imparfait* is regularly used to mark certain pragmatic effects, such as politeness as in (5) and (6). The difference between (5) and (6) is that in cases like (5), verbs of all kinds are used in the *imparfait*, whereas in (6) it is the first person singular form of the verb *vouloir* 'to wish, to want', which, in such cases, typically combines with *verba dicendi*, e.g., *dire* 'to say', *demander* 'to ask', etc. In the following sections, I will propose two different analyses for the two cases.

(5)   *Allô, euh, je vous **appelais**$_{IMP}$ pour vous demander si* [...]
      'Hello, euh, **I called** in order to ask if [...]'
(6)   *Je **voulais**$_{IMP}$ vous poser une question*
      'I **wanted** to ask you a question'

It has often been claimed in the literature (Viguier 2007; Anscombre 2004) that the *imparfait de politesse* (or *imparfait d'atténuation*) as exemplified by both (5) and (6) does not represent a distinct meaning of the *imparfait*, but is a mere usage, that is, an instantiation of the past imperfective value illustrated in (2). According to some authors, it is a rhetorical device which serves to relegate the respective speech act into the past, thereby mitigating its face-threatening potential. As Imbs (1960: 97) puts it, this respectful step back in time metaphorically symbolizes a respectful step back *vis-à-vis* the interlocutor. More recent approaches, however different in detail, still agree that the "modalizing" politeness effects (Saussure and Sthioul 2005: 111) expressed by the *imparfait de politesse* are in one way or another computationally derived from an invariant basic value, which may be either temporal (Curat 1991), aspectual (Mellet 1992; Mainguenau 1981), modal or modal-like (Coseriu 1976; Touratier 1998)[4] or other (Berthonneau and Kleiber 1994, see Section 3.1 below).

In what follows, I will show that in cases like (6) this claim is ill-founded. *Je voulais* + *verbum dicendi* is a conventionalized formula with an entrenched discourse function. Furthermore, it is non-compositional in the sense that its overall meaning no longer reflects the individual meanings of its components. As I am going to show, this is especially true for its temporal and aspectual properties. Even though the verbal constituent of the formula, the verb *vouloir*, is formally marked as *imparfait*, it can appear in contexts from which the *imparfait* is normally excluded. What is more, many native speakers of Modern French do not even consider *je voulais* + *verbum dicendi* as an expression of the past tense. Both claims will be substantiated by a look at diachronic data which will be shown to provide

quantitative as well as qualitative evidence in favour of the analysis proposed here.

3.1. The *imparfait* and the background construction of French

According to Weinrich's ([1964] 2001) groundbreaking analysis, the most important function of the *imparfait* at the discourse level is to mark background information in narratives. Whereas the foreground information in (7), coded in the *passé simple*, is part of a sequence of successive events (that is, the narrative proper), background passages provide information about particular circumstances of the foreground. Specifically, background information never makes the narrative advance. As Ducrot (1979) puts it, "lorsqu'un événement est rapporté à l'imparfait, [...] on ne le voit pas apparaître, se produire: on le voit, pour ainsi dire, déjà là" ('if an event is rendered in the *imparfait*, it seems that one doesn't see it appearing or coming about: one sees it, so to speak, already there', Ducrot 1979: 10, translation mine). Thus, in (7)[5] the *imparfait* encodes a state of affairs which already is the case when the foreground event begins and which still obtains after the latter is finished.

(7) *Il **entra**$_{PS}$ dans le village. L'église **était**$_{IMP}$ **située** sur une hauteur.*
'He **entered** the village.   The church **was situated** on a height.'
Passé simple   *Imparfait*
FOREGROUND   BACKGROUND

The background function of the *imparfait* at the discourse level is paralleled by its inherently anaphoric character on the grammatical level. This means that a sentence like *l'église était*$_{IMP}$ *située sur une hauteur* is grammatically incomplete insofar as it is dependent on the existence of either a foreground event as in (8a) below (which repeats example 7), or at least of a certain moment in time which acts as an external reference point for the information coded in the *imparfait* as in (8b). Without such a reference event or reference point the usage of the *imparfait* is grammatically deviant, as in (8c). Such a reference point or event may of course be inferred from the context. Instead of speaking of "reference event/point", I will follow Kleiber (2003) and use the term "antecedent", which emphasizes the parallel with other types of anaphoric relations.

(8)   a. *Il entra dans le village.*   *L'église était*...

(8)   a. *Il entra dans le village.*   *L'église* **était**$_{IMP}$ *située sur une hauteur.*
       'He entered the village.   The church **was situated** on a height.'
      b. *Au XIXe siècle,*   *l'église* **était**$_{IMP}$ *située sur une hauteur.*
       'In the 19th century,   the church **was situated** on a height.'
      c.   ø   **L'église* **était**$_{IMP}$ *située sur une hauteur.*
                                     'The church **was situated** on a height.'

         ANTECENDENT   ANAPHOR

The anaphoric character of the *imparfait* is the discourse-structural corollary of its imperfectivity (see Kleiber 2003 for discussion). Whereas perfective foreground events have a neatly delimited beginning and end, states of affairs coded in the *imparfait* lack such delimitations. Therefore, they can be asserted to be valid only with respect to an antecedent. In example (2) given above, the background information is asserted to be fully true at the same time as the antecedent, whereas in (3) it is asserted to be imminent at the time of the antecedent. Note that this does not mean that outside the temporal frame established by the antecedent the imperfective event is explicitly asserted *not* to be true – thus, e.g., the church mentioned in (8a) is most probably still standing on the height after the foreground event has come to an end, and it may even stand there at the time of utterance of this sentence. In (8a) these possibilities are neither explicitly asserted nor openly ruled out. This means that events coded in the *imparfait* consist not only of a part which is asserted to have been effectively realized. Lacking clear-cut boundaries, they also always include parts which are only potentially realized (see below, Figure 4).

$$R$$
$$\ldots \ldots \rule{3cm}{0.4pt}\downarrow\rule{2cm}{0.4pt} \ldots \ldots | \ldots \ldots \rightarrow$$
$$E \qquad S$$

R: point of reference, time of the obligatory antecedent
E: event time,   _____   effectively realized, asserted
              . . . . .   potentially realized, not asserted
S: moment of speech
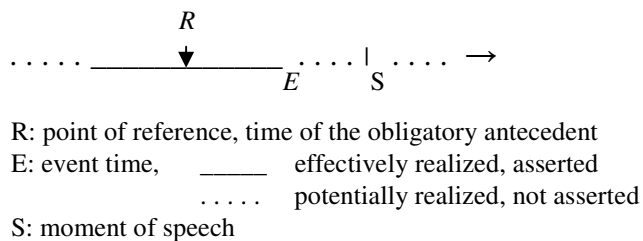
Figure 4. The tense-aspect structure of the French *imparfait*

In the literature, various aspects of the *imparfait* sketched in this section have been claimed to represent its underlying basic meaning from which all its other functions are synchronically derived as usages. Thus, for Saussure and Sthioul (2005), the basic meaning of the *imparfait* is its past imperfective character.[6] Other authors – for example Berthonneau and Kleiber

(1993, 1994; Kleiber 2003) – claim that all usages of the *imparfait* are manifestations of its inherently anaphoric character.

   An alternative way of putting together the various properties of the *imparfait* established in this section is the following. In French, the *imparfait*, as a consequence of its imperfective semantics, is the morphological marker of a grammatical construction which we will call the *background construction*. Its most important function is of a discourse-grammatical nature. It consists in providing background information to narrative foreground events. The grammatical reflex of this is what seems to be the inherently anaphoric character of the *imparfait*, which, however, really shows that the latter is part of a larger construction. In the following sections I will show that the *imparfait de politesse* has historically emerged from this background construction, that is, from the *imparfait* as described in the present section, but that in some contexts it underwent a process of entrenchment which has turned it into an autonomous, synchronically underived form-meaning pairing. In Section 4.2, I will provide qualitative evidence for the claim that in Modern French it has acquired present-tense value.

3.2. The *imparfait de politesse* – two different phenomena

As already indicated above, the label *imparfait de politesse* refers to two different phenomena, namely to cases like (5) on the one hand, where the *imparfait* occurs with all sorts of verbs, and to the formula *je voulais + verbum dicendi* on the other hand as in (6). The two types will be discussed separately. That there are differences between them is sometimes assumed in the literature (Saussure and Sthioul 2005: 109; Berthonneau and Kleiber 1994: 82) but these differences are hardly ever spelled out explicitly.

3.2.1. Case 1: the imparfait de politesse *with unspecific verbs*

In the case discussed in this section, the verbs encoded in the *imparfait* are semantically highly unspecific, and they can appear in all sorts of speech acts. The only property which these have in common is the inference that the hearer should in some way react to their illocution (for a diverging explanation, see Anscombre 2004: 80.). Thus, in (9) the hearer is asked to respond to a question, in (10) he is invited to react to a wish to engage in an exchange whose purpose is a request.

(9)   Reaction to a paper on linguistics (cf. Saussure and Sthioul 2005)
        Excusez-moi, mais je pensais$_{IMP}$ *à un contre-exemple*.
        'Excuse me, but I **thought/was thinking** of a counter example.'
(10)   Opening a conversation on the telephone (cf. Viguier 2007: 114)
        Allô, euh, je vous appelais$_{IMP}$ *pour vous demander une faveur*.
        'Hello, euh, I **called** in order to ask you a favour.'

According to Saussure and Sthioul (2005: 110–111), the use of the *impar-fait* in such contexts is motivated by the fact that it encodes a past thought or an intention on behalf of the speaker. In (9), this is obvious, but it is due to the semantics of the verb *penser* 'to think' rather than to the *imparfait*. In (10), in turn, the *imparfait* not only renders the speaker's past intention to call, but is used after the call has been effectively realized – hence, there is no need to resort to the notion of past intention here. Instead, I will follow the longstanding analysis according to which in cases like (9) and (10), the speaker "minimizes his own position as a speaker" by relegating the relevant state of affairs into the past (Lebaud 1991: 68, for discussion see Ber-thonneau and Kleiber 1994: 65–66). In other words, in such contexts the use of the *imparfait* is an integral part of a rhetorical procedure whose point is to leave open the question of whether or not the respective state of affairs is still to be considered valid at the moment of speech. If this is not so, then the addressee may feel free to draw the inference that there is no need to react to the utterance in question as in (11).

(11)   I thought$_{PAST}$ of a counter-example [*and maybe, I still do*].
        Metonymic inference: 'Feel free not to react to my intervention.'

The inference invited by the *imparfait* here is metonymic, not metaphoric in nature. It is essentially based on the latter's imperfective tense-aspect structure sketched in Section 3.1 above all on the unboundedness of the event time which – without being explicitly asserted – may potentially still be valid at the moment of speech:

[E potentially still valid]
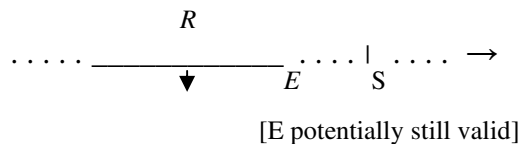
Figure 5. The tense-aspect structure of the *imparfait de politesse*

Insofar as the *imparfait de politesse* lowers the degree of current validity of the respective speech act, it is a strategy of negative politeness ("avoid embarrassing the other person", "be indirect", Lakoff 1973, see also Brown and Levinson 1987). In the cases under discussion here, this politeness strategy exploits the normal tense-aspect structure of the *imparfait* (see Saussure and Shtioul 2005, Anscombre 2004, Berthonneau and Kleiber 1994). In other words, cases like (9) and (10) do not represent autonomous values, but are mere usages of the French background construction. This can also be deduced from the fact that in examples like (9) and (10), there is always an identifiable single antecedent available (Anscombre 2004: 78; Berthonneau and Kleiber 1994: 81–87). In both (9) and (10), this antecedent has to be reconstructed from the context: in (9) it may have been an argument which was advanced during the talk on linguistics ('*when you said X*, I was wondering if...'), in (10) it may be the moment in which the exchange was effectively opened (i.e., in which the hearer picked up the phone). Thus, we may say that the special pragmatic effect of the *imparfait de politesse* of the type discussed in this section is in fact, as is usually claimed in the literature, computationally derived from the "normal" *imparfait*. More precisely, it invites a metonymic inference which exploits the systematic possibilities of the French background construction.

Since it cannot be distinguished from the "normal" *imparfait*, the *imparfait de politesse* of the type discussed in this section is extremely hard to find in corpora. Moreover, it seems to be extremely rare. In all, I could only identify two cases in the Frantext corpus (even though there may be more).

3.2.2. Case 2: the formula je voulais + verbum dicendi

Whereas the case discussed in the foregoing section is highly unspecific both from a semantic and a pragmatic point of view, the second type of *imparfait de politesse,* which will be treated in the following paragraphs, has a distinct semantic and pragmatic profile. As outlined above, here the *imparfait* marks a first person usage of the verb *vouloir* 'to wish, to want', which in turn precedes verbs of saying such as *dire* 'to say', *parler* 'to speak', *demander* 'to ask', *proposer* 'to propose' etc. The only verb which frequently combines with *je voulais* without being a verb of saying is *savoir* 'to know' as in *je voulais savoir* 'I would like to know'. On a pragmatic level, *je voulais + verbum dicendi* is a formula which serves the realization of precisely defined illocutions, namely assertive speech acts,

queries and requests. As I will show, this construction is a conventionalized discourse marker with a whole range of textual functions.

In the case of *je voulais* + *verbum dicendi*, the *imparfait* is not the only origin of politeness. In fact, in examples like (12), there can be three different sources of politeness effects. Firstly, since the sentence in (12) is coded in the *imparfait*, it instantiates the rhetorical "trick" sketched in Figure 5. Secondly, the speech act in question is introduced by means of the verb *vouloir* 'to wish, to want' as a mere *intention*. Thus, it is this intention and not the speech act as such which is rhetorically relegated into the past by means of the *imparfait*. Thirdly, speech acts introduced by *je voulais* are presented as something which the speaker has been planning for a certain time already. Under normal circumstances, planned speech acts are particularly relevant and legitimate. This can be an additional source of politeness, because suggesting to the addressee that the ensuing speech act is not spontaneous but has been planned may be a way of expressing respect for him (see (12)). Thus, *je voulais* + *verbum dicendi* can be used to mark effects of positive politeness. However, as we shall see later in this section, politeness effects depend on the respective context and are therefore not a systematic feature of *je voulais* + *verbum dicendi*.

(12)   [*Ça*] *fait que je vais vous dire, chef:* **je voulais**$_{IMP}$ **vous demander** *comme ça, de demander au* [...] *capitaine, de vous demander de demander* [...] *au colonel* [...] *au rapport de demain matin... une permission de huit ours* [sic!] *pour moi* [...]. (Courteline, *Le Train de 8 h 47*, 1888, cf. Frantext)
       'This is why I'll tell you, Sir: **I wanted to ask you** like that, to ask [...] the captain, to ask you, to ask the colonel [...] at tomorrow's staff meeting for a permission of eight hours for me'

At the textual level, *je voulais* + *verbum dicendi* functions as a discourse marker. Normally, the task of a discourse marker is to signal the coherence relations underlying the organization of the respective text. The function of *je voulais* + *verbum dicendi,* however, is to signal the very absence of such relations. More specifically, it serves to introduce brand-new, highly relevant information. The following cases can be distinguished.

a. Discourse-internal change of topic. In (13), a passage taken from a private letter, *je voulais* introduces a kind of *post scriptum*, that is, a topic which is maximally unrelated to the topic(s) addressed so far, and which is only mentioned because the speaker has planned to do so beforehand.

(13)   [D]*e pareilles confidences de la part de celui que j'aimerais se-*
         raient bien loin de me déplaire. Serait-ce que tu ne m'aimes pas?
         [*…*]*Chère amie, **je voulais encore te parler** de ma conduite d'hier*
         soir, que tu as attribuée à la vanité et à l'amour-propre ce qui m'a
         bien affligé. (Hugo, *Lettres à la fiancée*, 1822, cf. Frantext)
         'Confidentialities of this kind on the part of the person I'd love
         would be far from arousing my displeasure. Is it possible that you
         do not love me? [*…*] Dear friend, **I also wanted to talk to you**
         about my behaviour last night that you attributed to vanity and
         pride, which afflicted me greatly.'

The information introduced by je *voulais + verbum dicendi* is usually
brand-new for the hearer (but of course not for the speaker), and is nor-
mally information which the speaker considers to be of maximum rele-
vance. This becomes particularly clear in example (14).

(14)   *Il y a quelque chose que **je voulais vous dire**… je compte partir*
         bientôt, moi aussi. (Gide, *Les faux-monnayeurs*, 1925, cf. Frantext)
         'There is something I **wanted to tell you**… me too, I am planning
         to leave soon.'

As can be seen from a comparison between (13) and (14), discourse-
internal je *voulais + verbum dicendi* sometimes does not convey politeness
(see (13)) whereas in other cases it does (see (14)).
     b. Discourse-initial functions. The formula *je voulais + verbum dicendi*
often appears at the opening of an exchange. A typical example of this is
(15).

(15)   – *Midi. Tiens ! [...] voilà André.*
         – *On entend les cris de vos enfants sur la route, dit André.*
            *Je **voulais** vous **dire bonjour** en passant [...]. je ne reste pas [...]*
         – 'Midday. Look! [...] that's André.
         – One hears the cries of your kids from the street, said André.
            I **wanted to say hello** while I was passing by [...] I'm not staying.'
                                        (Chardonne, *L'épithalame*, 1921, cf. Frantext)

As this example shows*, je voulais + verbum dicendi* in discourse-initial
position normally not only serves to simply set the topic of an incipient

exchange – above all, it provides a *justification* for the very fact that the speaker is opening this exchange. The formula is particularly suitable for this purpose for the reasons given above: it conveys negative politeness by rhetorically relegating the current speech act (or, more precisely, the *intention* of performing this speech act) into the past, and it expresses positive politeness by presenting the exchange as having been projected beforehand. Moreover, justifying the opening of an exchange is in itself polite. Likewise, in discourse-internal contexts *je voulais + verbum dicendi* appears polite if it is used to justify a change of topic (as in (14)), whereas in cases like (13), where it simply *announces* a change of topic (without justifying it), its effect is neither polite nor impolite.

Importantly, a comparison of (13), (14) and (15) shows that – even though it can be used to convey politeness – *je voulais + verbum dicendi* is not polite *per se*.[7] In other words: politeness effects are not the *meaning* of the formula *je voulais + verbum dicendi* – they are mere *usages* in the sense sketched in Section 2. What the formula really means is 'I planned to say something [and maybe I still want to]$_{\text{INFERENCE}}$'. Many of the usages derived from this meaning exploit the fact that planned utterances normally appear more relevant than spontaneous ones, and that, all other things being equal, speakers assume more responsibility for planned utterances than for spontaneous interventions. This can be a source of positive politeness, as in (14) and (15), but it can also give rise to other context effects. Thus, *je voulais + verbum dicendi* may, among other things, be used to express a high degree of sincerity on behalf of the speaker (see (16)).

(16)   [A]*vant de partir,* **je voulais** *au moins* **vous dire** *que je n'aimerais jamais que vous* [...] (Scribe, *Le Verre d'eau*, 1840, cf. Frantext)
        'Before I leave, **I wanted to tell** you at least that I will never love anyone but you [...]'

Of course, (16) could be interpreted as a speech act which is not only sincere, but which, on top of this, is also extremely friendly and therefore potentially polite. However, in contexts of this type, *je voulais + verbum dicendi* could in principle also be used to introduce sincere speech acts which are straightforwardly impolite, e.g., (16a).

(16a)   *Avant de partir,* **je voulais** *au moins* **vous dire** *combien je vous déteste.*

'Before I leave, **I wanted to tell** you at least how much I dislike you.'

Examples (16) and (16a) show that even though sincerity and politeness effects interact in various ways, neither of them can be regarded as the meaning proper of the construction.[8] This, however, raises an important question: if politeness is a mere context effect, is it an effect derived from the *imparfait* (as has been argued in the literature, see Section 3.1), or is it derived from *je voulais + verbum dicendi* as a whole? In the following section, I will argue in favour of the second option. Specifically, I will show that *je voulais + verbum dicendi* is a non-compositional construction insofar as the *imparfait* which appears on the verb *vouloir* 'to wish, to want' exhibits certain anomalies which distinguish it from 'regular' usages of the *imparfait*.

3.2.3. What is the antecedent of je voulais + verbum dicendi?

It has been pointed out that the French *imparfait* is an anaphoric tense for which an antecedent must be available. Under normal circumstances, this antecedent can either be explicitly mentioned or it may be recovered from the context.

In the case of *je voulais + verbum dicendi*, the antecedent referred to by the *imparfait* is the time when the plan of the exchange was conceived by the speaker (see Berthonneau and Kleiber 1994: 83). However, this antecedent is normally not explicitly mentioned in the context. In fact, in all the examples discussed in Section 3.2.2 it is not even recoverable from the context as a single, identifiable event or point in time. In other words, the formula *je voulais + verbum dicendi* still somehow presupposes an antecedent ('when I planned the current exchange'), but this antecedent cannot be chosen freely as it should be if the *imparfait* was still genuinely anaphoric. Rather, the erstwhile antecedent has turned into a *stereotyped construal* which is part of the conventional meaning of the formula.

In the following section (4.1), I will provide evidence from historical data which show how *je voulais + verbum dicendi* became entrenched by frequent usage and how, in the process, the antecedent turned into a 'frozen' construal. This, in turn, has consequences for the question addressed in the last subsection: if a stereotyped antecedent 'when I planned the current exchange' has become part of the conventional meaning of the formula

(thereby ceasing to be an antecedent in the original sense of the term), then this meaning cannot be considered as derived from the individual meanings of its components, especially not from the 'normal' meaning of the *imparfait*.

In the previous paragraphs, it has been claimed that the major motive for using *je voulais + verbum dicendi* consists in suggesting that the current utterance follows from a pre-established plan. As has been shown in the last subsections, this may be advantageous for various reasons. But in many cases it is doubtful whether the *imparfait* in *je voulais* really refers back to the past event of planning the current speech act, or if it is the current speech act itself which is profiled. The construction literally says '[when I planned the current exchange]$_{ANTECEDENT}$, I planned$_{IMP}$ to say X [and maybe I still do]$_{INFERENCE}$', but what it really means is 'I am now going to say something which follows from a pre-established plan [and which therefore is particularly justified, sincere, important, polite etc.]'. Originally, this 'thing meant' is not part of the meaning of *je voulais + verbum dicendi*, but merely an invited (metonymic) inference. However, if this inference becomes entrenched by frequent usage, the formula *je voulais + verbum dicendi* will undergo a second semantic change: it will cease to refer to a past state of affairs (that is, a past intention), and acquire a present tense meaning. In Section 4.2 I will adduce qualitative corpus evidence for the claim that a metonymic change of this sort has taken place.

4.   Corpus data

In this section, I will discuss two kinds of corpus data. In Section 4.1, quantitative data will be used to show that *je voulais + verbum dicendi* is an entrenched construction which has a historical beginning in time. In Section 4.2, I will discuss qualitative corpus evidence which shows that *je voulais + verbum dicendi* is no longer an expression of the past tense.

4.1. Quantitative data analysis

The diachronic data taken from the Frantext corpus give a fairly clear picture. Even though this corpus covers the history of French from the early 16th century onwards, *je voulais + verbum dicendi* as an expression of a planned direct speech act ('I wanted to say something [and maybe I still

want to]INFERENCE') is only sporadically attested before the 19th century. Table 1 shows the results for *dire* 'to say', which is the most frequent single verb to combine with *je voulais* in the sense discussed in the above sections.

In Table 1 I deliberately neglected occurrences of *je voulais dire* with functions which are markedly different from those sketched above. This includes, e.g., cases where *je voulais dire* functions as a discourse marker of self-repair: […] *l'empire que garde le clergé sur la multitude des ânes... Je voulais dire "des âmes"* '[…] the sway under which the clergy holds the mass of asses… *I wanted to say* 'of souls'' (France, *Les Dieux ont soif,* 1912, p. 144, cf. Frantext). Table 1 also ignores occurrences of *je voulais dire* in which the inference 'and maybe I still want to' is cancelled (as in example (20) below).

The first two lines in Table 1 indicate the historical period, line 3 gives the absolute number of occurrences of *je voulais vous dire, je voulais te dire* and *je voulais dire* as expressions of planned direct speech acts, and in line 4 an index is given which reflects the number of occurrences relative to the corpus size in the respective period.

Table 1. Je voulais + dire as a marker of planned discourse

1	1780	1800	1820	1840	1860	1880	1900	1920	1940	1960
2	-1799	-1819	-1839	-1859	-1879	-1899	-1919	-1939	-1959	-1979
3	1	–	6	7	13	12	20	39	31	26
4	1.9	–	8.3	6.5	17.4	18.1	33.6	28.2	27.3	27.1

Table 1 shows that, apart from a sporadic occurrence in the 1780s, which we shall discuss later in this section (see below, (19)), there is a continuous usage of *je voulais dire* in the functions discussed in 2.4 only from the 1820s onwards. In the corpus, cases of *je voulais te dire* with the pronoun *te,* indicating an intimate relation between speaker and addressee, are narrowly outnumbered at 58 by 64 occurrences of *vous*, the pronominal indicator of a more formal relationship. This may have to do with the fact that *je voulais + verbum dicendi* as a marker of planned discourse exhibits a strong affinity to the domain of communicative distance.

Apart from such quantitative findings, qualitative data contained in the corpus reveal further insights. Thus, *je voulais + verbum dicendi* is sporadically used before 1820, but in all of these cases, the context always contains an identifiable antecedent. A case in point is (17), taken from a

17th century sermon. Here*, je voulais* combines with the verb *représenter* 'to show' (this example is not taken into account in Table 1, where only instances of *je voulais* with the verb *dire* are listed).

(17)   *Ce serait ici, Chrétiens, qu'après vous avoir fait voir que l'attrait du divin amour, c'est d'aimer pour Jésus-Christ, que le modèle du divin amour, c'est d'aimer comme Jésus-Christ, il faudrait encore vous expliquer que la consommation du divin amour, c'est d'aimer en Jésus-Christ et par Jésus-Christ. Mais les deux premières parties m'ayant insensiblement emporté le temps, je n'ai que ce mot à dire. **Je voulais donc, Messieurs, vous représenter que** Dieu [...] a établi l'homme le médiateur de toute la nature visible, et Jésus-Christ, Dieu-homme, seul médiateur de toute la nature humaine.* (Bossuet, *Sermon pour la fête de l'Annonciation de la Sainte Vierge*, 1662, p. 174)

‘It would be here, Christians, that, after having shown to you that the attraction of divine love consists in loving for Jesus' sake, and that the model of divine love is to love like Jesus, I still have to explain to you that the realization of divine love is to love in Jesus and by Jesus. But since the first two parts have imperceptibly used up my time, I have only this to tell you. **I wanted to show you, gentlemen** that God [...] has made man the mediator of all visible nature, and [that he has made] Jesus Christ, [who is] God and man, the only mediator of all of human nature.’

Here, the phrase *je voulais donc vous représenter* 'I wanted to show you' refers back to a passage where the projected structure of the sermon is explicitly developed and which therefore contains the antecedent of *je voulais vous représenter* (see (18)).

(18)   *[A]yant besoin de trois choses pour être réunis à Dieu: d'un attrait puissant, d'un parfait modèle et d'une voie assurée, Jésus-Christ nous fait trouver tout en sa personne; et il nous est lui seul tout ensemble l'attrait qui nous gagne à l'amour de Dieu, le modèle qui nous montre les règles de l'amour de Dieu, la voie pour arriver à l'amour de Dieu: c'est-à-dire, si nous l'entendons, que nous devons 1° nous donner à Dieu pour l'amour du Verbe incarné, que nous devons 2° nous donner à Dieu à l'exemple du Verbe incarné, que nous devons **en troisième lieu nous donner à Dieu par la voie et***

par l'entremise du Verbe incarné. *C'est tout le devoir du chrétien*, **c'est tout le sujet de ce discours**. (p. 163–164, emphasis mine, U.D.)

'To us, who need three things in order to be united with God: a strong attraction, a perfect model and a safe way, Jesus Christ makes us find all this in his own person. He himself is the attraction that wins us God's love, the model which shows us the rules of God's love, and the way to reach God's love. This means, if we understand [correctly], we must, firstly, give ourselves to God for the love of the Incarnation of the Word [i.e., Jesus Christ, U.D.], secondly, give ourselves to God following the example of the Incarnation of the Word, and, **in the third place, we have to give ourselves to God in the way shown by the Incarnation of** the **Word and by His mediation**. This is the entire duty of a Christian, and **this is the subject of this** [i.e., the following, U.D.] **speech**.'

In other cases, the antecedent can be inferred from the context. In (19), taken from Diderot's *Jacques le Fataliste* (which, at the same time, is the only example of *je voulais dire* before 1820 in Table 1), Jacques' master interrupts a story which he is about to tell his servant because he has reasons to believe that the latter wants to comment on something he just said ('but Jacques, I think you have something to tell me'). Even though it is not explicitly stated in the text, it is obvious that Jacques has indicated his desire to speak by a gesture or an expression on his face. It is this gesture which must be considered as the antecedent of Jacques' *je voulais vous dire*.

(19) *Le maître*: […] *Epouser! Cela serait bien dur, aussi ne l'appréhendé-je pas; mais il y aura des dédommagements, et dans ce cas ils sont considérables* [...]. *Mais, Jacques*, **je crois que tu as quelque chose à me dire**.
Jacques: Oui; **je voulais vous dire** *que vous fûtes en effet plus malheureux que moi, qui payai et qui ne couchai pas.* (Diderot, *Jacques le Fataliste et son maître*, 1784, p. 766)
'The master: Marry! This would be quite difficult, and also I did not quite get it; but there will be compensations, and in this case they are considerable [...] But Jacques, **I think you have something to tell me.**

> Jacques: Yes, **I wanted to tell you** that you were really more
> unlucky than I, who paid and did not sleep.'

Reference to a stereotyped antecedent of the type 'when I planned this dis-
course', i.e., an antecedent which is neither overtly marked in the text itself
nor inferable from the context, is only attested from the 1820s onwards. At
the same time, however, uses like (18) and (19) continue, of course, to be
possible up to today. In Table 2, only cases which are of interest here are
taken into account, i.e., occurrences of *je voulais vous dire, je voulais te
dire* or *je voulais dire* without an identifiable antecedent.

Table 2. Je voulais + dire with no identifiable antecedent

1780 -1799	1800 -1819	1820 -1839	1840 -1859	1860 -1879	1880 -1899	1900 -1919	1920 -1939	1940 -1959	1960 -1979
–	–	2	3	8	7	11	35	28	20
–	–	2.8	2.8	10.7	10.6	18.5	25.3	24.6	20.8

These data show an uninterrupted usage of *je voulais dire* without antece-
dent from the 1820s onwards. The construction became relatively frequent
by the 1860s. The fact that before 1820 not a single instance of *je voulais
dire* (or another *verbum dicendi*) with this property is attested suggests that
the 'freezing' of the antecedent was the result of a language change – the
outcome of this change was a conventionalized construction. As a conse-
quence of this change, *je voulais + verbum dicendi* turned into a conven-
tional marker of planned discourse, whose meaning was no longer fully
derived from the meaning of its individual components. This marker could
be used, among other things, for politeness effects.

A short remark is appropriate here concerning the data in Tables 1 and
2. Although predominantly quantitative in nature, they nevertheless show
that linguistic data always presuppose some qualitative (in this case seman-
tic) interpretation of the raw data found in the corpus. The data in Table 2
are filtered more strongly than those in Table 1, since their selection is
based on an additional qualitative criterion (i.e., the absence of an identifi-
able antecedent). It is for this precise reason that the overall picture they
yield is more coherent than the results in Table 1.

4.2. Qualitative data analysis

As we have seen, the normal use of the *imparfait* as part of the French background construction does not rule out the possibility that the past event may still be valid at the moment of speech. In Sections 3.2.1 and 3.2.2 it was shown that both types of the *imparfait de politesse* discussed there systematically exploit this inference for politeness effects. In the current section, I want to examine the question of whether, in the case of *je voulais + verbum dicendi*, e.g., in *je voulais vous demander une faveur* 'I wanted to ask you a favour', the current validity of the (past) intention to realize a request is still (only) an inference, or if it can already be considered as part of the formula's meaning. Put more simply, the question is whether the construction still means '[when I planned the current exchange]$_{\text{ANTECEDENT}}$, I planned$_{\text{IMP}}$ to say X [and maybe I still do]$_{\text{INFERENCE}}$', or if, as a result of a semantic change, it has come to mean 'I am now going to say something which follows from a pre-established plan [and which therefore is particularly polite, sincere etc.]'.

   In all those cases where *je voulais* is merely the first person singular of the verb *vouloir* and does not represent the formula *je voulais + verbum dicendi*, the inference of current validity ('and maybe I still do') may be cancelled, as is shown in the following example (20), where the speaker's original intention to personally thank the addressee is no longer upheld. In such cases we can also always reconstruct an antecedent from the text or the context, which clearly indicates that we are not dealing here with the conventional formula *je voulais + verbum dicendi* as described in the previous sections. In (20) it is the adverb *hier* 'yesterday' which makes reference to the antecedent.

(20)   *Cher ami, quelles belles fleurs et que vous êtes aimable de me gâter ainsi.* **Je voulais aller vous en remercier** *en personne* **hier.** *Mais hier et aujourd'hui je suis dans les éditeurs jusqu'aux oreilles.*
        (Sand, *Correspondance,* 1841, cf. Frantext)
        'Dear friend, what beautiful flowers, and how kind of you to spoil me like this. Yesterday, **I wanted to go and personally thank you for this**. But yesterday and today I am up to my ears in work with my editors.'

If *je voulais + verbum dicendi* is used as a device to performatively realize a planned speech act (that is, if it represents the formula discussed in the

previous sections), then this inference must not be cancelled, since otherwise there can be no performative realization of the speech act in question. This makes a change of the type discussed above highly expectable. However, given the extremely rigid normative traditions of Standard French, such a change will be reflected only with great reluctance in corpora composed of literary prose. For most of the examples contained in the Frantext corpus, it is impossible to determine on structural or contextual grounds if *je voulais + verbum dicendi* is (still) intended to refer to a PAST INTENTION or if it (already) profiles the CURRENT SPEECH ACT. Thus, an example like (21) with a subordinate clause in the present tense does not categorically exclude that *je voulais* in the main clause is still to be construed as past imperfective.

(21)　　[*J*]*e voulais*$_{IMP}$ *te dire* *qu'Adèle est*$_{PRES}$ *très malheureuse et qu'elle ne vit*$_{PRES}$ *que dans l'espoir de te retrouver.* (Delay**,** *Le Aïe Aïe de la corne de brume*, 1975, cf. Frantext)
　　　'**I wanted to tell you** that Adèle **is** very unhappy and that she only **lives** by the hope to see you again.'

Likewise, examples such as (22), where the verb of the subordinate clause is also marked as *imparfait*, do not necessarily imply that a present tense construal is excluded for *je voulais dire*, because in this case the state of affairs referred to in the subordinate clause may also be interpreted as still being valid at the moment of speech.

(22)　　*Je voulais*$_{IMP}$ *vous demander, Suzanne* […], *ce que vous pensiez*$_{IMP}$ *de l'affaire de Maria Sambuy.* (Daniel-Rops, *Mort, où est ta victoire?*, 1934, cf. Frantext)
　　　'**I wanted to ask you**, Suzanne [...], what you **thought** of the Maria-Sambury affair.'

Temporal adverbs like *maintenant* 'now', *aujourd'hui* 'today' etc., which could indicate that the temporal frame of the respective utterance is the present rather than the past, can also be ruled out as a criterion, since it is normally not clear if they modify the entire construction, in particular its head constituent *je voulais* (thereby locating it in the present), or just the embedded *verbum dicendi*. Thus, in (23) it could be the INTENTION (expressed by *je voulais*), but also only the act of TELLING (represented by the

verb *dire*) which is situated in the present by the adverb *aujourd'hui* 'today'.

(23)   *Ce que **je voulais te dire aujourd'hui**, c'est qu'à ton refus, mon enfant, je marie demain mes six filles*. (Nodier, *La Fée aux miettes*, 1831, cf. Frantext)
         'What **I wanted to tell you today** is that, as a consequence of your refusal, I marry my six daughters tomorrow.

There are, however, a handful of cases in the Frantext corpus where only a present-tense interpretation is plausible. This is the case in (24):

(24)   *Mais il y a autre chose que **je voulais vous dire** pendant que nous parlons d'homme à homme et que je ne suis pas obligé de vous engueuler*. (Vian, *Le Grand sommeil*, 1948, cf. Frantext)
         'But there is something else that **I wanted to tell you** while we talk from man to man and while I am not obliged to shout at you.'

In (24) the speaker announces a planned speech act, but he is doing so in a situation which he clearly has *not* planned beforehand – in (24), it is explicitly stated that this situation, in particular the fact of not having to shout at the addressee, comes as a surprise. Thus, the time frame established by the temporal clause *pendant que nous parlons d'homme à homme* 'while we are talking from man to man' (which provides an explanation as to why the speaker wants to raise the issue in question at this exact moment) is the period surrounding the moment of speech, i.e., the present. This in turn means that *je voulais vous dire* 'I wanted to tell you' does not refer to a PAST INTENTION which may or may not be still valid at the moment of speech, but to a plan which the speaker would currently like to realize. Examples of this type are rare in the Frantext Corpus: in all, I counted three cases of this type, the earliest of which is attested in a novel dating from 1938.[9] But they sound too normal to native speakers to be considered as accidental slips. This in turn means that in contemporary French *je voulais + verbum dicendi* has two meanings, namely the (older) past-tense meaning '[when I planned the current exchange]$_{ANTECEDENT}$, I had$_{PAST}$ the intention to say X [and maybe I still do $_{PRES}$]$_{INFERENCE}$', which exists side by side with the more recent present-tense meaning 'I am now going to say something which follows from a pre-established plan [and which therefore is particularly polite, sincere etc.]'.

4.3. Conclusions

From what has been said so far, we can conclude that *je voulais + verbum dicendi* has undergone two successive changes. Originally an instantiation of the background construction, it first became entrenched as a marker of planned speech acts without identifiable antecedent. This construction is a conventional discourse marker which may appear in contexts where it is neither particularly polite nor impolite (see above, example (13)), but it can, among other things, be used to politely justify the opening of an exchange (see (15)) or a change of topic within an ongoing exchange (see (14)). Our analysis thus justifies the theoretical distinction between usages and meanings developed in Section 2: indicating that the ensuing speech act has been planned beforehand is the construction's *meaning* while marking politeness effects is one of its *usages*. As a result of a second change, *je voulais + verbum dicendi* ceased to be an imperfective past-tense construction and acquired a present-tense meaning. In the following section, I want to address the question whether, as a result of this change, the construction has undergone a process of split.

5.   Polysemy or split?

Modern German has a defective verb *(ich) möchte* '(I) would like to', which diachronically goes back to the verb *mögen* 'to like'. Even though *(ich) möchte* '(I) would like' is originally a conjunctive form of *mögen*, for most native speakers of contemporary German it has a present tense indicative meaning, and no longer appears to be derived from the verb *mögen*. Therefore, speakers sporadically use the new *möchte* verb in an – etymologically 'false' – infinitive form **möchten*. In other words, *möchte* has turned into an autonomous, underived form. Most probably, this was a direct consequence of its entrenchment in a highly frequent formula of polite request. In this case, the outcome of the change is not polysemy, but split. However, in the case of *je voulais + verbum dicendi*, speakers of French have the impression that this formula still somehow represents the *imparfait*. This intuition is what motivates the monosemic analyses sketched in Section 3.1 (for a polysemy explanation of monosemic approaches, see Waltereit and Detges 2007: 64). Why did the succession of semantic changes which affected *je voulais + verbum dicendi* lead to polysemy and not to a split? The answer can, once again, be found in the corpora.

If we compare the data in Table 1 to those in Table 2, we find that *je voulais + dire* without identifiable antecedent was not only rising in absolute numbers – of equal significance is the fact that the *proportion* of these 'anomalous' usages among the total number of all *je voulais + dire* (including those with 'regular' antecedents) also underwent a dramatic increase. Table 3, which gives the respective percentages, shows that *je voulais + dire* without identifiable antecedents outnumbered 'regular' occurrences of *je voulais + dire* from the 1860s onwards.

Table 3. Proportion of *je voulais + dire* without identifiable antecedent

1780 -1799	1800 -1819	1820 -1839	1840 -1859	1860 -1879	1880 -1899	1900 -1919	1920 -1939	1940 -1959	1960 -1979
–	–	33%	43%	62%	58%	55%	90%	90%	77%

However, even though the 'regular' occurrences of *je voulais + dire* became numerically marginal in certain periods (especially in the time between 1920 and 1950), they were never completely superseded. This means that the bridging contexts which linked *je voulais + dire* as a marker of planned discourse to the background construction (i.e., the 'normal' usage of the *imparfait*) had remained intact at all times. In other words, even though the meaning of *je voulais + verbum dicendi* is synchronically non-compositional insofar as it cannot be derived from its components – and in particular not from the *imparfait* (since it lacks an identifiable antecedent and may no longer express past-tense reference) – it is nonetheless *motivated* in the sense that speakers still intuitively know why the construction is formally marked as *imparfait*. In many respects, this situation resembles what we find in lexical polysemy, where two or more conventional meanings of a form are linked to each other by a network of associative relations. Split of the *mögen/ möchte* type will only occur if these relations are no longer intuited by the speakers.

Notes

1. I deliberately neglect the fact that many authors who really share the basic convictions of the monosemy model prefer to call themselves polysemists (Viguier 2007: 36–40).
2. For a more complete analysis of the relationship between diachronic change and polysemy, see Blank (2001: 104–108).

3.   Unless indicated otherwise, all examples are mine.
4.   For Coseriu (1976) cases like (6) are evidence for the claim that the *imparfait* is not simply an expression of pastness, but generally refers to states of affairs which are "inactual" (Coseriu 1976: 92). According to him, "inactuality" is a property which characterizes *all* usages of the imparfait, i.e., (2) and (3) as well as (4).
5.   This example has been adopted in a slightly modified form from Berthonneau and Kleiber (1994: 89).
6.   According to Saussure and Sthioul (2005: 105) the basic meaning of the *imparfait* can be rendered by the formula R≠S & R⊂E, i.e., the point of reference R always precedes the moment of speech S, and is always included in the event time E.
7.   This has already been noted by Saussure and Sthioul (2005: 110).
8.   By constrast, the formula *je voudrais...* 'I would like...', which is often (erroneously) treated as a synonym or a near-synonym of je *voulais + verbum dicendi*, is a specialized expression of polite request. Within this formula, the verb *vouloir*, coded in the conditional mood, can be combined with noun phrases (*je voudrais deux morceaux de sucre* 'I would like two pieces of sugar') as well as with infinite verbal phrases (*je voudrais voir ce film* 'I would like to see this movie'). If it is used with a *verbum dicendi*, e.g. in *je voudrais vous dire que...* 'I would like to tell you that...' it expresses that the speaker is politely asking for the hearer's permission to perform the ensuing speech act. That there are considerable differences between *je voudrais* and *je voulais* is sometimes noted in the literature, but the nature of these differences usually remains unclear. Thus, Anscombre (2004: 85) confuses the problem by mixing up *je voulais + verbum dicendi* with *je voudrais* as a formula of polite request and *je voulais* as an expression of the *imparfait de politesse* of case 1 (see above, Section 3.2.1).
9.   The text in question is the *Chronique des Pasquier* by Duhamel, published in 1938.

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Valency constructions and clause constructions or how, if at all, valency grammarians might *sneeze the foam off the cappuccino*

Thomas Herbst

> *A[n] ... optimistic view is that when scholars set out from different starting points within different traditions, use data of different kinds and independent arguments, but nevertheless arrive at similar conclusions, then the conclusions are worth studying closely, because the convergence of views is* prima facie *evidence that they are well founded.*
>
> (Michael Stubbs 2009: 27)

1. Introduction

The starting point of the following considerations is the valency approach as it has been developed in German linguistics since the 1960s, where it has since become the standard model of syntactic description for German. Since English requires different descriptive categories from German, various models for transferring the valency approach to English were developed (Emons 1974; Allerton 1982; Herbst 1983; Somers 1987).[1] I will be referring here to the version of the theory that forms the basis of the *Valency Dictionary of English* (Herbst, Heath, Roe, and Götz 2004) and is developed further in *An Introduction to Syntactic Analysis* (Herbst and Schüller 2008).

  Although the roots of the valency concept can be found in Tesnière's (1959) dependency model and in the work of linguists such as Bühler ([1934] 1999) or de Groot (1964: 114–115), it is remarkable that the development of the concept is strongly linked to descriptive linguistics in a foreign language context. The reason for this is in itself an indication of the character of the phenomenon described: for foreign learners of a language valency is an error-prone area because it involves idiosyncratic knowledge that has to be learnt. It is thus not surprising that linguists who work in the

context of a foreign language or of foreign language teaching should emphasize the importance of such aspects of language as valency or collocation:[2] the unpredictability of combinations such as *strong wind, weak tea, raise an objection,* or *do one's homework* is parallelled by the unpredictability of combinations of the kind *manage to do* or *succeed in doing*. Collocation and valency represent different facets of the same phenomenon: whereas collocation is the co-occurrence of one lexical item with another lexical item, valency is about the co-occurrence of a lexical item with a particular grammatical construction.[3] From a foreign learner's point of view, both collocation (in the sense as defined by Hausmann 1985) and valency phenomena can be seen as "encoding-idioms", to use a term introduced by Makkai (1972; cf. Fillmore, Kay, and O'Connor 1988: 502; Croft and Cruse 2004: 250): the difficulty for the foreign learner is not to understand what *weak tea* means but to actively produce *weak tea* and not *feeble tea* or *light tea*.

Empirical research in a foreign language context can be used to gain insights that are of relevance to theoretical linguistics in that errors occurring in the use of a foreign language can highlight aspects of language which do not necessarily appear quite so prominent in the analysis of L1 use: from a foreign language linguistics point of view, it has always been clear that a model of language that relegates phenomena such as collocation or valency to the periphery of language is not adequate. The detailed analysis of what is "wrong" about foreign language production – be it language text produced by non-native speakers or language text that is the result of translation (Granger 1998; Gilquin 2007; Nesselhauf 2005; Herbst 1994) – has shown the role that has to be attributed to such concepts as Coseriu's (1973) *Norm* or Sinclair's (1991) idiom principle.

It is interesting to see that corpus linguistics has arrived at very similar conclusions. Although the type of collocations corpus linguists focus on is more the statistically significant *sandy-beaches* type than the semantically significant *weak-tea* type (Herbst 1996), corpus linguistics has shown that in any account of language an enormously important role has to be attributed to the syntagmatic element, to combinations of words, and that the distinction between syntax and lexis is not as strict as is sometimes assumed (Sinclair 2004: 164; Tognini Bonelli 2002).[4]

These assumptions about the importance of idiosyncratic knowledge are also shared by construction grammar (Ellis 2003; Fillmore, Kay, and O'Connor 1988). It seems to offer an attractive framework for accommodating the insights of foreign language linguistics and corpus linguistics

because, for instance, valency and collocation can be analysed as item-based constructions.

It can thus be stated that linguists working in different fields of the subject – cognitive linguistics, corpus linguistics and foreign language linguistics – have arrived at rather similar views about the nature of language as such in that they attribute an important role to item-specificity, units larger than one word[5] and to storage (Herbst 2009). Thus there definitely is a "convergence of views", which however must be treated with a certain amount of caution, as Stubbs (2009: 27) points out: "Goldberg (2006) uses hardly any corpus data, and never cites frequencies. She makes a brief passing reference (p. 88) to pattern grammar (Hunston and Francis 2000) but seems not to recognize that corpora could provide the data which the theory predicts."

It is obvious that despite the fact that these three approaches in linguistics seem to be heading in the same direction, they come from different theoretical, methodological and terminological backgrounds and thus take different perspectives. In particular, it can be said that although all three approaches take different positions in key questions from those of Chomskyan generative grammar, construction grammar in some ways shows strong parallels to the tradition of Chomskyan linguistics, especially where certain aspects of methodology are concerned. Nevertheless, the similarities between the basic convictions seem to be sufficiently high to make it worthwhile to study the merits and drawbacks of each approach very closely. In what follows I will make an attempt to discuss a number of problems from the point of view of corpus based valency research and relate them to concepts proposed by construction grammar. Since construction grammar has been described as "a moving target" (Fillmore 1988) and since a number of different approaches exist within the framework (Croft and Cruse 2004; Fischer and Stefanowitsch 2006), I will concentrate in particular on some of the points made in Goldberg's *Constructions at Work* (2006).

In comparison with collocation, valency entails a further level of abstraction in that the concept of valency does not refer to the co-occurrence of words or lexical items but to the co-occurrence of a lexical item with a grammatical construction such as a particular phrase or clause. It is probably safe to assume that this kind of abstraction also happens in the minds of speakers: their knowledge of possible uses of the verb *apply* (in the sense 'make a formal request', *LDOCE* 2005) may well include the fact that in

active clauses it can be used with a noun phrase subject and be followed by a *for*-prepositional phrase as in (1) or a *to*-infinitive clause as in (2):[6]

(1)   [...] *if you're **applying** for a course at university, then it doesn't matter what A-levels you're taking, or what courses you've put down for at the five universities.* BNC

(2)   *Little research has studied adults who got to the stage of **applying** to do a course but who then did not enrol for it.* BNC

Obviously, the description of verb complementation or valency involves further levels of abstraction. These phenomena can be described from two perspectives:

— from the point of view of a governing word or valency carrier, which is the approach taken in valency models, which, after all, have their origin in dependency grammar,
— from the point of view of different types of clause, which is the approach taken, say, in the *Comprehensive Grammar of the English Language* (1985) in its distinction of seven clause types, or, it seems, also in construction grammar where the focus of discussion in this respect lies on such constructions as the caused motion construction or the ditransitive construction.

The valency model that forms the basis of the *Valency Dictionary of English*, which provides a valency description of 511 verbs, 544 adjectives and 274 nouns of English based on the Cobuild corpus, combines the aspects of valency and clause structure (Herbst and Schüller 2008). This affects the distinction between different types of necessity and the description of the complements, which includes information about their ability to occur as the subject of an active or a passive clause.

The model can be outlined as follows (for more details see Herbst and Schüller 2008): a verb or other valency carrier is seen to open up a number of valency slots, which can be

— expressed syntactically by complements
— characterized semantically in terms of participant roles.

The term complement is used in valency theory to refer to the formal realization of a valency slot. Complements are item-specific and distinguished from adjuncts in that an element can be classified as a complement if

— it is determined in its form by the valency carrier and/or
— it is obligatory in the sense that it has to be realized when a particular valency carrier (a lexical unit, not a lexical item) is used.

Despite a large number of formal tests that have been used in valency theory to establish the distinction between complements and adjuncts,[7] it has to be recognized that it takes the form of a gradient rather than a clear-cut dividing line.[8] Complements can occur as subject of a clause – subject complement units (SCUs) or as an element within the predicate of a clause – predicate complement units (PCUs). SCUs, PCUs and adjunct units (AUs) can be realized by phrases or clauses.

Valency slots can be characterized as obligatory, contextually optional or optional: a valency slot is obligatory if it has to be realized whenever the valency carrier is used, optional if it need not be realized and contextually optional if it need not be realized as long as the participant (or referent) can be identified from the context. Thus the second complement slot of *apply* is contextually optional because it is not realized in contexts such as

(3)   *Thus a three-year lectureship in English Literature was advertised, <u>Robyn</u> **applied**, was interviewed along with four other equally <u>desperate</u> and highly qualified candidates, and was appointed.* NW52

Semantically, valency slots can be characterized in terms of participant roles, which are, however, much more verb-specific and less abstract than the roles originally suggested by Halliday (1967/1968, 1970) and Fillmore (1968). The experience in describing the semantic aspects of complements in the *Valency Dictionary of English* is parallelled by that of the FrameNet project as described by Fillmore (2007: 131): "With respect to the naming of frame elements, we learned early that for many of the complex frames there is no non-arbitrary way of fitting them into the standard sets of *case roles* or *thematic roles* in recent literature."[9] The function of participant roles is to distinguish the different valency slots of one valency carrier from one another: there is thus no need to use general labels that could be applied more generally so that in the case of *apply*, such participant roles as

PERSON/INSTITUTION APPLYING, THING APPLIED FOR and PER-
SON/INSTITUTION APPLIED TO can be used.

A valency description of this use of *apply* can thus take the following
form:

Table 1. Complement inventory *(*apply*)*

I	optional	[NP]$_{ACT-S}$ / [by NP]	PERSON/INSTITUTION APPLYING
II	contextually optional	[to-INF] [for NP]$_{PASS-S}$	THING APPLIED FOR
III	optional	[to NP]$_{PASS-S}$	PERSON/INSTITUTION APPLIED TO

2.   Complement inventories, valency patterns and valency construc-tions

The analysis of valency can be made with respect to two different levels of
abstraction. One is to establish a complement inventory of a valency car-
rier. Some such analysis seems indeed necessary in order to account for the
fact that one valency slot (with one participant role) can be realized by dif-
ferent formal complements: this is the case with the [for NP]-complement
or the [to-INF]-complement in (1) and (2), but also applies to cases where a
valency slot can be realized as a subject complement unit or a predicate
complement unit, especially in active and passive clauses:

(3)   *Thus a three-year lectureship in English Literature was **advertised**,
          Robyn applied, was interviewed along with four other equally des-
          perate and highly qualified candidates, and was appointed.* NW52
(4)   *"And what if you advertised a skilled job?"* BNC

A different kind of abstraction is carried out if one makes statements about
valency patterns. The term valency pattern is used to refer to a particular
combination and order of complements. In fact, it can be shown that an
account of valency phenomena solely in terms of complement inventories
is insufficient for a number of reasons (Herbst 2007):

Firstly, some complement slots are optional in some patterns but not in
others, as is shown by:

(5)   a. *We'd love to **hear** from you about it.* VDE

b. *I want to **hear** about it.* ᵦₙC

c. *We'll **hear** from an economics writer on why the economy is expanding faster than unemployment is decreasing.* ᵥDE

d. **We'll hear on why the economy is expanding faster than unemployment is decreasing.*

Secondly, in the case of complement slots which have more than one realization, only certain combinations are possible:

(6) a. *"First, we'll go down to the kitchen and **pack** a small picnic^{II}," she told him* [...] ᵦₙC

b. *The following Monday Peter **packed** his rucksack^{I} and caught the train to Ipswich.* ᵦₙC

c. *He began to **pack** things into the picnic basket.* ᵦₙC

d. *He **packed** his suitcases with clothes and books.* ᵦₙC

e. **He began to pack things the picnic basket.*

f. **He packed his suitcase books.*

(7) a. *So they **load** the ships down there now ...* ᵦₙC

b. *The Middle East International of Feb. 22 described the anti-war movement as "relatively inactive", although Marseille dockers from the communist CGT trade union refused on Feb. 13 to **load** arms, ammunition and equipment for the Gulf.* ᵦₙC

c. *[...] they bought these old ships up, we **loaded** them with scrap iron.* ᵦₙC

d. *Where in previous years these vessels had been purely large fishing vessels **loading** salted fish into barrels for immediate export to their own ports, now there came great numbers of large factory ships and modern trawlers which could process fish, package it and freeze it for indefinite periods.* ᵦₙC

e. **They loaded the ship fish.*

f. **They loaded onto the ship with fish.*

This means that a complement inventory will have to be supplemented by an indication of the possibilities of the combination of the complements in any case.[10]

If we take valency patterns as a term for purely formal categories, the term valency construction lends itself to indicating the combination of valency patterns and the semantic contribution of the complements and the valency carrier contained in a valency pattern. This corresponds to the use

of the term construction in construction grammar as "learned pairings of form with semantic or discourse function" (Goldberg 2006: 5).[11] It might be useful to use the term valency construction to refer to abstract representations that comprise the lexical unit of the valency carrier (including its meaning) and its complements (with their participant roles) in the order in which they occur in a thematically unmarked clause (Herbst and Schüller 2008). Valency constructions can then be seen as item-specific constructions which in the formation of sentences combine with other constructions such as particular clause structure types.[12] (7c) and (7d) can then be described as representing the following valency constructions of *load*:

> [NP$_{ACT-S}$ LOADER]__load__[NP CONTAINER]__[with NP GOODS]
> [NP$_{ACT-S}$ LOADER]__load__[NP GOODS]__[into/onto NP CONTAINER]

It is important to realize that the same valency pattern can represent different valency constructions.

(8)   *Philip Swallow has, in fact, flown before* [...] $_{CP4}$

Thus a sentence such as (8) is ambiguous in that it can represent the following valency constructions:

> [NP$_{ACT-S}$ PASSENGER]__fly
> [NP$_{ACT-S}$ PILOT]__ fly

3.   Participant roles and clausal roles

The concept of participant roles used here is similar to that outlined by Goldberg (2006: 39), who also says that participant roles "may be highly specific and are often unique to a particular verb's meaning". Indeed the lexicographical experience in the compilation of *Valency Dictionary of English* has shown that very often rather specific cover terms of an ad-hoc nature had to be used to describe a participant role and that in many cases no account of the possible lexical realizations of a complement could be given other than an open or closed list of collocates.

Goldberg (2006: 39) distinguishes participant roles from argument roles. The latter "correspond roughly to traditional thematic roles" and "because they are defined in terms of the semantic requirements of particular constructions, [...] are more specific and numerous than traditional thematic

roles". It is obvious that a more general level of roles will be required if one wishes to account for generalizations across individual valency carriers. Thus, presumably, there is no need to use different participant roles for:

(9)   *Mr. Advani's enemies*[I] **consider** *him*[II] *dangerous*[III]. $_{VDE}$
(10) *And did you*[I] **regard** *Girton and Cambridge*[II] *as particularly spe-cial*[III]? $_{VDE}$
(11) *I*[I] **judged** *it*[II] *as safe*[III] *to proceed*[II]. $_{VDE}$
(12) *Political commentators*[I] **think** *it*[II] *unlikely*[III] *that he will give up his quest for leadership*[II]. $_{VDE}$

The question is to what extent one can argue that such more general roles are properties of the construction, as Goldberg (1995: 43)[13] does, or whether what is analysed as the construction in such cases is not a generalization over a number of item-specific valency constructions.

In the above examples, like in many others, there is no conflict between specific participant roles and more general roles and one would not want to argue that the construction adds a new element of meaning to that ex-pressed by the participant roles of the verbs anyway.

This is different, however, in cases where the same participant roles can be realized in different valency patterns of the same verb, cf. some of the examples quoted above (and repeated here for convenience):

(6)   c. *He began to* **pack** *things into the picnic basket.* $_{BNC}$
      d. *He* **packed** *his suitcases with clothes and books.* $_{BNC}$
(7)   c. *[...] they bought these old ships up, we* **loaded** *them with scrap iron.* $_{BNC}$
      d. *Where in previous years these vessels had been purely large fishing vessels* **loading** *salted fish into barrels for immediate export to their own ports, now there came great numbers of large factory ships and modern trawlers which could process fish, package it and freeze it for indefinite periods.* $_{BNC}$

The fact that such sentences are not identical in meaning has been subject of much discussion in the literature (e.g. Palmer 1981; Fillmore 1977; Goldberg 2006).[14] It seems appropriate to say that a new dimension of meaning is added by the structure of the clause, and to introduce a level of clausal roles to express such differences: for instance, the difference be-tween the (c) and (d) examples above can be accounted for by attributing a role such as FOCUSSED AFFECTEDNESS to the first predicate complement

unit in each sentence to account for the prominence these constituents are given with respect to information structure.

A similar point can be made with respect to a role AGENTIVITY, which is to account for the fact that the subject in many clauses receives an agent-like interpretation, as in (7a) and (12), for example:[15]

(7)   a. *So they **load** the ships down there now ...* BNC

(13)   *Outside the chateau, trucks were **loading** ...* BNC

This distinction between participant roles and clausal roles (Herbst and Schüller 2008: 158–163) is similar to the distinction between participant roles and argument roles but participant roles are described as "instances of more general argument roles" by Goldberg (1995: 43). Clausal roles, although being more general in character, cannot be seen as subsuming a number of different participant roles, as is shown by the *load* example: if the participant role that we have called CONTAINER is realized by a subject complement unit, it has the clausal role of *AGENTIVITY* (13), if it is realized by the first predicate complement unit, it has the clausal role *FOCUSSED AFFECTEDNESS* (7a) and if it is realized by the second PCU, it is has no such clausal role at all (7c):

Table 2. Participant roles and clausal roles

(13)	*trucks*	*were loading*		
	SCU			
	CONTAINER			
	AGENTIVITY			
(7a)	*they*	*load*	*the ships*	
	SCU		PCU	
	LOADER		CONTAINER	
	AGENTIVITY		*FOCUSSED AF-FECTEDNESS*	
(7c)	*we*	*loaded*	*them*	*with scrap iron*
	SCU		PCU1	PCU2
	LOADER		CONTAINER	GOODS
	AGENTIVITY		*FOCUSSED AF-FECTEDNESS*	

A further example can be presented by verbs with ergative patterns such as *open*, where one could also argue that the SCUs of the active clauses in (14a) and (14b) have a more agent-like quality.[16]

(14) a. *He **opened** his shop in Nurenburg selling radios and producing transformers in 1930 [...]* BNC
   b. *The new shop **opens** in October.* BNC
   c. *Shops were opened in Stockton, Redcar and in 1945 their last shop was **opened** in Darlington.* BNC

Although *his shop* in (14a), *the new shop* in (14b) and *shops* in (14c) all represent the same participant role, this role cannot be interpreted as a specification of AGENTIVITY since it would also have to be interpreted as a specification of FOCUSSED AFFECTEDNESS.

AGENTIVITY and FOCUSSED AFFECTEDNESS are not superordinate terms under which participant roles can be subsumed, as is the case with argument roles, but clausal roles that are added to the respective SCUs and PCUs on the basis of the properties of the structure of the clause. Such roles could be integrated into the description of the valency constructions since they do not hold for all sequences of SCU + verbal unit + PCU; nevertheless, they can be generalized over particular types of valency constructions and thus also be part of the description of such constructions.

4. Profiled roles

Up to this point, there are obvious parallels between the valency approach as proposed here and construction grammar:

— Both approaches recognize, although in slightly different ways, that the verb and its valency specifications play an important role in the formation of sentences.
— Neither theory assumes that different valency patterns of the same valency carrier should be derived from one another.
— That there is an element of sentence meaning which is not covered by the participant roles and the meaning of the valency carrier is a point made by construction grammar which can be integrated into valency theory in the form of clausal roles or argument roles, even if, from a valency point of view the postulation of argument structure constructions may be in need of some further justification.

Nevertheless, there are also a number of important differences. These mostly concern particular claims made in construction grammar. It is possible that the parallels are more far-reaching than it may seem, but some statements made by Goldberg (2006) are expressed in a way that may be interpretable unambiguously within the theory but raise questions from without.

One such point concerns the idea of profiling. Goldberg (2006: 39) argues that a subset of the participant roles, "namely those roles which are lexically *profiled*, are obligatorily expressed, or, if unexpressed, must receive a definite interpretation." Goldberg (1995: 45) gives *rob* and *steal* as examples: "In the case of *rob*, the target and the thief are profiled, while in the case of *steal* the valuables are profiled", which is represented as follows (with bold font indicating profiled roles):

rob **<thief target** goods>
steal **<thief** target **goods>**

However, there is corpus evidence to the contrary, as is shown by the following instances of uses of *steal*, in which the role described as profiled is not expressed and in which the referents are not identifiable from the context either:

(15)   *It is particularly despicable to **steal** from a charity.* VDE
(16)   *Would you **steal** from shops if it could be guaranteed that you would not get caught?* BNC
(17)   *Breaking into and **stealing** from a caravan is usually the work of casual thieves.* BNC

Similarly, both the CONTAINER and GOODS ("loaded-theme" in Goldberg's terminology) are given as profiled roles of *load* by Goldberg (2006: 41). This does not seem justified in the light of uses such as the following:[17]

(7)   a.   *So they **load** the ships down there now* [...]. BNC
      b.   *The Middle East International of Feb. 22 described the anti-war movement as "relatively inactive", although Marseille dockers from the communist CGT trade union refused on Feb. 13 to **load** arms, ammunition and equipment for the Gulf.* BNC
(13)   *Outside the chateau, trucks were **loading*** [...]. BNC
(18)   *In order to save making two journeys it was **loading** with the passengers for the onward flight.*

While there is no corpus evidence of the kind presented for *steal* above for *rob*, (19) contradicts Goldberg's (2006: 40) Correspondence Principle which "states that profiled participant roles of the verb must be encoded by profiled argument roles of the construction, with the exception that if a verb has three profiled roles, one can be represented by an unprofiled argument role (and realized as an oblique argument)." Since profiled roles in English are "realized as Subj, Obj or the second object in ditransitives" (Goldberg 2006: 40), the fact that *from shops* in (19) is an oblique realizing the profiled role victim (Goldberg 1995: 48) contradicts this principle.

(19)   *I was 14 or 15. I'd already been arrested for nicking cars and **robbing** from shops.* ᵥDE

(19) might be seen by Goldberg (1995: 232) as a dialect difference to be explained in terms of different lexical entries, but (20) is a similar case:

(20)   *The Grand Union people, already very short of money, decided that there was little point at present in going for the wide gauge, especially as it was (conveniently) reported that traders preferred **loading** into narrow boats.* ʙNC

Even if one concedes that (19) and (20) represent rather rare uses, the question poses itself how the roles of a verb such as *meet* should be described in terms of profiling.

(21)   *He had not yet **met** all the people concerned; too many of them were still only names.* ʙNC
(22)   *"Haven't we **met** before?" he said.* ʙNC
(23)   *In fact, he said, the accused **met** with Castro specifically at the behest of the CIA, to convey American thinking on insurgencies in Nicaragua and El Salvador.* ʙNC

Presumably, on the basis of (21) and also (22) one should assume two profiled roles, which can be merged to one role, but then (23), in which one of these roles is realized by a *with*-phrase, must be seen as a violation of the Correspondence Principle. In any case, the way that profiled arguments are described suggests a difference between the constructions with an NP-complement and a [*with* NP]-complement. This criticism also applies to all divalent verbs with an obligatory prepositional complement:

(24)   *So how do you **account** for their being there?* _{VDE}
(25)   *Perhaps the cool mountain air didn't **agree** with the sunny Janet.* _{VDE}
(26)   *The clock tower has gone to **allow** for a central one-way traffic system that neither helps pedestrians nor speeds traffic.* _{VDE}

One definite weakness of the theory at present is that the Correspondence Principle applies only to "simple sentences" (Goldberg 2006: 40). Rather complex problems arise if one looks at verbs where the minimum valency in the active use is 2, but where the PCU can either be an [NP] or a clause complement, as is the case with *add*:

(27)   *With respect to translations I have occasionally **added** a comment.* _{VDE}
(28)   *But he **added** that in some areas up to a quarter of the crop had been lost because of problems with storage, transport and labour.* _{VDE}

Irrespective of the fact whether one sees the [NP]-complement and the [*that*-CL]-complement as realizations of the same valency slot, both complements are obligatory and as such express profiled roles (in Goldberg's terms). At present it is not quite clear whether the category OBJ could apply to *that*-clauses or *to*-infinitive clauses as well since – despite their different use in linguistics – the terms do not seem to have been defined in this context.[18]
  The same is true of examples such as

(29)   *Carol **became** a colourist for a children's animation company.* _{VDE}
(30)   *If you live in a seaside village, as I do, there is a tendency to **become** a bit paranoid about litter.* _{VDE}
(31)   *Children grew up to respect and **become** like their parents.* _{VDE}

Goldberg (2006: 40) only specifies profiled argument roles for the ditransitive construction but such examples show that an obligatory valency slot can be realized by noun and adjective phrases as well as prepositional phrases.
  What is much more important, however, is the treatment of the relationship between actives and passives. Goldberg (2006: 40) accounts for passives in that the Correspondence Principle can be overridden by other constructions: "As a default principle, the Correspondence Principle can be overridden by particular constructions that specify that a particular argument be deemphasized and expressed by an oblique or not at all. Passive, for

example, is a construction that overrides the Correspondence Principle and ensures that a normally profiled role (e.g. agent) be optionally expressed in an oblique *by* phrase." Since the passive can also be used in order not to express a participant at all,[19] it would also be difficult to argue in cases such as (32) that the referent of the participant is identifiable, so no "definite interpretation" (Goldberg 2006: 39) seems possible.

(32)   *Some accounts say that the fire engines were **attacked**, overturned, and set alight.* BNC

This, however, means that the participant role which can be expressed by the $[\text{SCU}]_{act}$ in active clauses need not be expressed at all, which contradicts the definition of profiled roles. This treatment of the passive is surprising in an approach that argues convincingly against derivations of "alternations" and argues that the "formal patterns involved are more profitably viewed as constructions on their own terms" (Goldberg 2006: 38). Basing judgements about what is a "normally profiled role" on active sentences may obscure the analysis. It may seem more appropriate to identify all possible participants of a valency carrier and classify the corresponding valency slots as obligatory, optional or contextually optional on the basis of whether they have to be expressed or not when the valency carrier is used. This is the approach that underlies the descriptions given in the complement inventories of the *Valency Dictionary of English*[20] and one which has the advantage of allowing for such factors such as setting (Ungerer and Schmid 2006: 185–189) and profiling of participants in an utterance by a combination of lexical and constructional choices.[21]

5. Item-specificity

One of the attractions of the construction grammar approach to corpus linguists and especially foreign language linguists is that it emphasizes the role of the idiosyncratic element in language. It is obvious that the idea of item-specific constructions has a particular appeal to valency grammarians since valency phenomena can be seen as item-specific.[22] Goldberg (2006: 56) herself points out that there is "evidence that adults retain much verb-specific knowledge as well", but she also says: "Semantically similar verbs show a strong tendency to appear in the same argument structure constructions. *Help* and *aid* cited above [as examples of verbs taking disparate ar-

gument structure patterns; TH] are unusual; more typcially, verbs that are closely related semantically do appear in the same argument structure constructions" (Goldberg 2006: 58).

Of course, it very much depends on what one means by "tendency".[23] It is obvious that many valency carriers that are semantically similar also share certain valency characteristics – on the other hand, the mere fact that valency properties have been described in dictionaries such as in the large German valency dictionaries (Helbig and Schenkel 1973; Schumacher, Kubczak, Schmidt, and de Ruiter 2004) or the *Valency Dictionary of English*, but also in the form of verb patterns in English learner's dictionaries shows that item-specificity features highly in this area.[24] One does not, as a rule, write a dictionary if a few general rules would do.

Despite the regularities that there certainly are, *help* and *aid* are certainly not unusual on the basis of:

(33) a. *Pat **helped** her grandmother walk up the stairs.* QE.
    b. **Pat **aided** her grandmother walk up the stairs.* QE

(34) a. *??Pat **helped** her grandmother in walking up the stairs.* QE
    b. *Pat **aided** her grandmother in walking up the stairs.* QE

Examples of item-specificity include:

(i) Verbs of transport: while verbs such as *fly* and *drive* allow the caused motion construction with animate objects, *sail* does not:

(35) a. *The plane **flew** up the fjord, which seemed so narrow that the mountains were on both wing tips at the same time.* BNC
    b. *A person who is scared of ballooning will nearly always **fly** the aircraft onto the ground instead of making well held-off landings.* BNC
    c. *Then a helicopter pilot **flew** them to an area of bare ice studded with dark rocks near the Allan Hills (76°S; 156°E).* BNC

(36) a. *The car **drove** away.* BNC
    b. *But, allowing that he could, he might just about have been able to **drive** the car to Exeter Sunday night.* BNC
    c. *You're sure I can't **drive** you to the airport?* BNC

(37) a. *A Scarborough fishing boat will **sail** out of the harbour tomorrow after major restoration work which followed a collision at sea.* BNC

    b. *I was lucky enough, through my association with the Stornoway Sea Cadets, to **sail** whalers and dinghies around the islands ...* _{BNC}

    c. **He **sailed** his friends to the island.*

(ii) The verbs *manage* and *succeed* take different types of complementation:

(38)   *It was true that he had been educated at a public school, but he **managed** to disguise this handicap very well.* _{NW}

(39)   *Pretender Charles attempted to enter England in 1744, and **succeeded** <u>in</u> landing in Scotland the following year* [...] _{BNC}

(iii) Verbs such as *believe, consider, expect, imagine, judge, recognize, regard, remember, think* show a rather messy distribution of valency patterns (Herbst 2009):

Table 3. Valency patterns of semantically similar verbs

	+ N + Adj	+ N + N	+ N + as N	+ that-CL	+ N (+) to-INF
believe	+			+	+
consider	+	+	+	+	+
expect				+	+
imagine	+	+	+	+	+
judge	+	+	+	+	+
recognize			+	+	+
regard			+		
remember			+	+	
think	+	+		+	+

Such examples are indications of the unpredictable nature of valency patterns, which is even more apparent when one considers possible lexical realizations. In the light of such evidence, valency phenomena are clear candidates for constructions which could be stored in the mind if one follows the principles outlined by Goldberg (2006: 64):[25]

> It is clear that knowledge about language must be learned and stored as such whenever it is not predictable from other facts. Thus evidence that a word or pattern is not strictly predictable provides sufficient evidence that the form must be listed as a construction in what is sometimes called a 'constructicon,' in allusion to an expanded lexicon (e.g. Jurafsky 1996). At the same time, unpredictability is not a necessary condition for positing a stored con-

struction. There is evidence from psycholinguistic processing that patterns are also stored if they are sufficiently frequent [...] (Goldberg 2006: 64)

It is obvious that the parallels between semantic aspects of valency carriers and the valency patterns in which they appear allow generalizations, which will also have to be accounted for. Evidence from language data shows that such generalizations very often do not take the form of strict one-to-one-correspondences. However, it seems possible to say that certain valency patterns tend to occur with a subclass of valency carriers with a certain meaning, whereas another subclass of valency carriers with that meaning occurs with a different valency pattern to express the same constructional meaning (where overlap between different subclasses is quite common, as the above examples show). It might then be possible to establish an inventory of constructions (at the level of argument structure constructions) and relate valency carriers to the constructions in which they occur in the language. The fact that this relationship does not seem to be generally predictable is what makes valency phenomena item-specific. Argument structure constructions could then be seen as abstractions from what I have called valency constructions because these include the meaning of the valency carrier and the verb-specific participant roles.

This means, of course, that at the level of argument structure constructions, one must allow for the existence of constructions which serve to express the same meaning, as in the case of (40a) and (40b), where the [to-INF]-complement and the [V-ing]-complement express the GOAL of what it is that is being *tried*:

(40) a. *She tried to enjoy the quiet of the countryside.* VDE
 b. *Don't try teaching us our business.* VDE
 c. *If you want to minimize the room's irregularities, try decorating floors and windows in the same neutral colours.* VDE

While the *to*-infinitive only has the meaning of GOAL, the [V-ing]-pattern can also have a meaning of MEANS, as in (40c), which shows that a valency pattern can be polysemous.

6.   Idiom principle and creativity

It seems to be an essential component of the idiosyncratic nature of language that in very many cases words or morphemes that share certain se-

mantic properties also share certain formal properties, but that this does not apply to all members of the respective categories. The resulting unpredictability, particularly at the level of lexical choice, has been subject of much discussion in Sinclair's work (1991, 2004) and forms the basis of his dichotomy between the idiom principle and the open-choice principle. From a structuralist point of view, this can be accounted for in terms of Coseriu's (1973) distinction between *System* and *Norm*, which can be applied to the analysis of word formation (Burgschmidt 1977)[26] or valency (Herbst 1983):

> In der Norm findet sich das, was auf Grund des Systems bereits realisiert wurde, sie ist die formalisierte Gesamtheit der traditionellen Realisierungen. Das System dagegen enthält darüber hinaus die noch nicht verwirklichten Möglichkeiten einer Sprache, es ist die Gesamtheit der möglichen Realisierungen, die sich auf Grund der Regeln des Sprachsystems ergeben, auch wenn sie noch nicht verwirklicht sind. (Coseriu 1973: 40)
> 'The norm contains what has been realized on the basis of the *System*, it is the fomalized totality of traditional realizations. The system furthermore contains all realizations that have not been realized yet, it is the totality of the potential realizations which the system of the language allows even if they have not been realized yet.'

Whereas in Coseriu's model the *System* forms the basis of the *Norm*, the generalizations in construction grammar are the result of language use, which has a psychological plausibility that is not intended in Coseriu's model. It is plausible that speakers arrive at such generalizations and that historically valency carriers change their valency patterns. Nevertheless, if one describes the valency properties of individual words one is faced with the same problem as when deciding which words are to be included in a dictionary, namely to what extent a word such as a neologism or a new word use is established in the language community. This concerns uses such as Goldberg's example (41), (42) and (43), quoted from P.G. Wodehouse[27]

(41)   *She sneezed the foam off the cappuccino.*
(42)   *He spoke with a certain what-is-it in his voice, and I could see that, if not actually disgruntled, he was far from being gruntled, so I tactfully changed the subject.*
(43)   *He pottered off pigwards.*

and (44), a quotation from a commentary in the *Süddeutsche Zeitung* (19/10/2007: 4):

(44) *Europa müht sich, unter Ächzen und Stöhnen, aber immerhin müht es sich voran.*
      'Europe is toiling, but at least it is toiling forward.'

It is obvious that such uses are not established and hence are not good candidates for any kind of lexicographical coverage. The BNC does contain utterances such as

(45) *Ages seemed to pass although it was only moments, until a pollen-laden grass flower tickled his nose and he **sneezed** himself back to life again.* BNC
(46) *Right* in *the centre is one person with a streaming cold who is sneezing his head off!* BNC

However, it is probably fair to say that corpus linguistics has focussed more on the fascinating aspects of statistical co-occurrence of words in different facets (Sinclair 1991, 2004; Hoey 2005; Hunston and Francis 2000). However, the description of the norm, of established usage, is a prerequisite for making judgements about creativity; and this is where construction grammar certainly adds an interesting dimension to the description of the linguistic abilities of human beings.[28] Such uses as (41) to (44) are creative applications of regularities which are abstractions from language use experienced by the speaker. What is important, however, is that such uses must not be interpreted as normal occurrences of a word or morpheme in a particular construction but that they are seen as *Konterkreationen* ('counter creations') in Hausmann's (1984: 399) sense, as conscious and intended violations of the norm, as described by Hockett (1958: 308):[29] "When P.G. Wodehouse wrote *Lord Emsworth ambled off pigwards*, the stretching of the pattern beyond its ordinary limits achieved some sort of special effect: *pigwards* was a new idiom."

Nevertheless, *pigwards* would hardly qualify for inclusion in a dictionary of English because – perhaps for lack of usefulness – it does not seem to have been taken over by the speech community and thus lacks institutionalization; rather it is an ad-hoc or nonce formation.[30] The status of (41) is probably very similar; in fact, Kay (2005: 90) speaks of "nonce applications of the pattern" in this context. Since valency descriptions are descriptions of the norm, they can only be based on prior usage and not account

for nonce-formations. Should the *sneeze*-use by some change in terms of what is culturally acceptable or for some other reason become more frequent, it could very well be included in the description of its *valency*.

However, this raises the problem of which uses one can attribute to such a creative extension of regularities, of whether such sentences ought to be seen as applications of constructions in the sense of "independently represented units" (Ellis 2003: 66) or as ad-hoc generalizations on the basis of item-specific valency constructions stored in the mind. Goldberg's point of view is that argument structure constructions can be used freely to produce sentences. Otherwise the Semantic Coherence Principle which "ensures that the participant role of the verb and the argument role of the construction must be semantically compatible" (Goldberg 2006: 40) would at least be unnecessary because if argument roles are generalizations of a number of more specific participant roles, they must be compatible - otherwise the generalizations were ill-founded. The question is, however, whether – if argument structure constructions were freely productive in this sense – we should not be able to observe such uses to a much higher degree in language use than is actually the case. Furthermore, most (if not all) of the examples given of such creative uses seem to have a special stylistic effect, which can be interpreted as a conscious violation of linguistic norms. Methodologically, such a view raises the problem of how one is to distinguish between sentences produced on the basis of valency constructions stored in the mind and sentences produced freely on the basis of argument structure constructions.[31]

This is fundamentally connected to the question of how much linguistic information is actually stored in the mind. One of the most intriguing questions in this context seems to be to what extent categories such as complement or adjunct (which are useful for certain descriptive purposes) are actually reflected in the abstractions that speakers make or whether – just as certain lexical associations seem to be stored – patterns in the sense of the valency constructions defined here are stored in a different way from frequent combinations of a verb and particular types of adjuncts or adjunct classes.[32]

7.   Construction grammar and the valency approach

Summing up, it can be said that the idea that "both item-specific knowledge and generalizations coexist" (Goldberg 2006: 63) is very much in line with

the findings of research in corpus and valency linguistics. This applies equally to the role that storage and item-specificity are attributed in the process of language acquisition,[33] where the general framework of cognitive approaches seems to be able to accommodate the findings of corpus linguistic research and foreign language linguistics. Furthermore, it is certainly true that construction grammar offers a plausible model to account for important aspects of the creativity of language. At the same time, it has to be said that some construction grammar research, and this is a parallel to the Chomskyan research paradigm before it, seems to concentrate on a relatively restricted number of linguistic phenomena in terms of a rather special use of terminology. As long as only a few argument roles are identified (and even that in rather vague terms), as long as the focus of the discussion seems to lie on noun phrases and prepositional phrases,[34] and as long as the focus of the discussion lies on a few selected constructions such as the ditransitive construction or the caused motion construction and no inventory of the basic constructions of clauses in English is given, it is difficult to say, for example, to what extent the several hundred different valency patterns that have been identified in the *Valency Dictionary of English* and which we intend to make available online through the Erlangen valency pattern bank (www.patternbank.uni-erlangen.de) can be subsumed under the argument structure constructions of construction grammar. At present, the construction grammar framework seems extremely promising but it is too early to say how far there really is a "convergence of views".

Notes

1. For surveys of valency in German see Helbig (1992), Ágel (2000); for earlier work see Herbst, Heath, and Dederding (1980).
2. Cf. Hausmann's (1985: 118) definition of collocation as "typische, spezifische und charakteristische Zweierbeziehungen von Wörtern" [typical, specific and characteristic relations between two words]. For research on collocation in this sense see Hausmann (1984, 1985); for a survey Hausmann (2007). See also Cowie (1981), Schmid (2003), Siepmann (2005). For studies of learner language see Nesselhauf (2005) and Gilquin (2007).
3. Compare the treatment of lexical and grammatical collocations by Benson, Benson, and Ilson (1986).
4. For an account of the importance of the idiomatic element in language see e.g. Fillmore, Kay, and O'Connor (1988).

5. See Sinclair (2004: 164): "Recent research into the features of language corpora give us reason to believe that the fundamental distinction between grammar, on the one hand, and lexis, on the other hand, is not as fundamental as it is usually held to be ..."; compare also Fillmore, Kay, and O'Connor (1988: 504); see also Bybee (2005: 3).

6. Examples are taken from the British National Corpus (BNC), the *Valency Dictionary of English* (*VDE*) and thus the COBUILD corpus, from David Lodge's novels *Nice Work* (*NW*) or *Small World* (*SW*), or quoted from source given (QE).

7. See, for example, Helbig (1992: 72–98) or Ágel (2000: 167–191). For English see Somers (1987) and Herbst (1983).

8. Compare also the discussion about complements vs. adjuncts in cognitive linguistics and construction grammar by Croft and Cruse (2004: 280–283).

9. Compare also Fillmore, Johnson, and Petruck (2003: 240).

10. One could argue that a possible generalization could be that one noun phrase PCU always occurs with a prepositional phrase PCU, although verbs such as *give* could be seen as counterexamples.

11. It is obvious that the concept of valency constructions is not in any way identical with the argument structure constructions discussed e.g. by Goldberg (2006) since valency constructions represent a much lower level of abstraction and have to be seen as item-specific.

12. It seems appropriate to make a distinction between active and passive valency constructions. One reason for this is that not all clause structure types require subjects and thus the valency slot of the subject complement unit is contextually optional, which means that the respective participant role will be considered as inherent in the sense that it is implied irrespective of whether the clause contains a subject or not.

13. "Part of a verb's frame semantics includes the delimitation of *participant roles*. Participant roles are to be distinguished from the roles associated with the construction, which will be called argument roles." (Goldberg 1995: 43).

14. Goldberg (2006: 41) expresses the difference in terms of seeing such sentences as instances of two different constructions – the caused motion construction (with the profiled roles 'cause' and 'theme' and the non-profiled role 'path'/location) and the causative + *with* constructions (with the profiled roles 'cause' and 'patient' and the non-profiled role 'instrument'.) Here, one may ask whether the role 'instrument' should not be restricted to uses of the following kind: *Working in the quarries er **loading** the lorries with a hand shovel.*BNC

15. Compare also: *If a ship had been there **loading**, well there was a couple of us boys used to tidy up after er after the <unclear> and things on there see.*BNC and *... in all we counted more than thirty ships awaiting their turn to* load *mackerel from the Scottish purse netters.* BNC

16. For the salience of actors, see Goldberg (2006: 184–186).

17. Goldberg (2006: 41) refers to the strangeness of *She loaded the truck. I won-der what she loaded onto it* and Fillmore's (1986) tests to distinguish definite from indefinite omission in this context. Although in the case of (7b) one could argue that the noun *dockers* provides some kind of context, the other examples do not carry any implication as to what was being loaded (apart from the fact that something must have been loaded, which, however, is also the case with many purely optional complement slots such as with the verb *read).*

18. In particular, it is not clear to what extent semantic or formal criteria play a role in determining what is called an object. See Langacker (1987: 355 and 358) for a definition of direct object and for the view that "*indirect object* ... is more coherently analyzed as a semantic role". Quirk, Greenbaum, Leech, and Svartvik (1985: 10.7 and 16.20) use the term *object* for noun phrases and clauses and say that objects of active clauses may "generally" become subjects of passive clauses, similarly Huddleston and Pullum (2002: 244–247); whereas Aarts and Aarts (²1988: 131–132) restrict the use of the term object to verbs which also occur in the passive.

19. Compare Stubbs and Gerbig (1993: 67–69).

20. For a detailed discussion of different kinds of optionality and conditions of "omission" see Ágel (2000: 247–266), Allerton (1982: 68–71), Fillmore (2007: 144–150), Goldberg (2006: 187–197), Helbig (1992: 99–107), Herbst and Roe (1996), Matthews (1981: 124–135). Compare also Thompson and Hopper (2001: 41–48) for a very critical view of semantic valence.

21. Compare Sinclair's (1991: 8) view: "A new-born communicative intent asses through various stages of realization, during which decisions about expression begin to be taken. These have lexical and grammatical ramifications ...".

22. See Ellis (2003: 67); on the item-specific character of valency see also Herbst (2009); Herbst and Klotz (2008). If one describes valency phenomena in terms of item-specific constructions, then this has the advantages that other constructions such as the patterns of "shell nouns" described by Schmid (2000) can be treated in very much the same way, although not all of them fall under the scope of noun valency.

23. Compare also the pattern grammar approach, see Hunston and Francis (2000: 29–36).

24. Cf. the *Oxford Advanced Learner's Dictionary,* also Hornby's (1975) *Guide to Patterns and Usage*, the *Longman Dictionary of Contemporary English* (2005) or the *Cobuild English Language Dictionary* (1987).

25. Additionally, one could take Croft and Cruse's (2004: 278) argument "[...] it does not necessarily follow [...] that speakers store every piece of grammatical knowledge only once" as further support for the storage of valency constructions.

26. Compare Goldberg (2006: 95).

27. P. G. Wodehouse ([1938] 1966), *The Code of the Woosters*, Hardmondsworth: Penguin, 6 and P. G. Wodehouse ([1929] 1966), *Summer Lightning*, 6.
28. Compare Kay's (2005) analysis of the *sneeze* example as a nonce application of the pattern. See also Kay (2002: 14-15): "It is not necessary, nor I think reasonable, on the basis of occasional examples [...] to conclude that caused motion is a productive construction. The hypothesis that the verb *sneeze* has acquired a caused motion valence for some speakers is more conservative and more in accord with the full range of facts presented above."
29. Compare also Ágel's (2000: 268–271) remarks about *Valenzkreativität* ('the creativity of valency') and *Valenzwandel* ('changes in valency').
30. Compare Schmid (2005: 75–83).
31. It must be doubted whether it is appropriate to distinguish between valency, argument structure constructions and adjuncts, as Goldberg (2006: 42) does when she treats *He baked her a cake* in the same way as (41), as a case in which the argument is contributed by the construction, but analyzes *for her* in *He baked a cake for her* as a "traditional adjunct".
32. This point of view is taken by Thompson and Hopper (2001: 47), when they say: "[...] 'argument structure' needs to be replaced by a greatly enriched probabilistic theory capturing the entire range of combinations of predicates and participants that people have stored as sorted and organized memories of what they have heard and repeated over a lifetime of language use. Such a theory, we suggest, will resemble a good unabridged dictionary much more than it will the types of statements of a given verb form's valence that are found in current discussion of argument structure." Although the amount of item-specific knowledge to be observed in the description of valency and in particular the difficulty experienced in the compilation of *Valency Dictionary of English* of finding appropriate cover terms for the participants that would actually be appropriate to specify by which lexical items they could be expressed definitely confirms such a view. At the same time, the whole notion of valency presupposes a distinction between item-specific constructions and non-item specific constructions which – at least for foreign language teaching and foreign language lexicography – has some justification.
33. See, for example, Tomasello (2002, 2003), Lieven, Behrens, Speares, and Tomasello (2003), Behrens (2007).
34. Compare Langacker (1987: 362): "The nominal complements of a relational predication are often referred to as its **arguments**." See also Langacker (1987: 309).

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What exactly is the question-assertion distinction based on? An exploration in experimental speech act theory[1]

Patric Bach and Dietmar Zaefferer

1. Conceptualizing the question-assertion distinction

Given that speech act theory originated in an abstract debate between ideal language and ordinary language philosophy it is not surprising that it has taken some time before experimental methods have come to be employed in order to settle speech act theoretical issues. It was probably Raymond Gibbs (1979) who made the first steps in this direction, but he remained an exception for a long time. More than two decades later and at the latest since more or less regular meetings on experimental pragmatics (2001 in Lyon, 2003 in Milan, 2005 in Cambridge, 2007 in Berlin) have been established, it seems to become more and more common practice to add experimental studies to the spectrum of methods used to investigate fundamental speech act theoretical issues.

Arguably, the question-assertion distinction is one of the most fundamental distinctions in speech act theory. To ask questions and to answer them by assertive illocutions are two essential achievements made possible by human language: a signalling system that fails to provide its users with these functions would not count as a human language. Whereas the question-assertion distinction itself seems to be rather trivial at least for its prototypical cases (asking for the correct piece of information from a range of given alternatives versus presenting a certain piece of information), it is much less clear what the basic ingredients of this distinction are and correspondingly how non-prototypical cases like rhetorical questions are to be understood. Here we propose to follow the lead of language itself: all languages provide a grammatical counterpart for the question-assertion distinction in the marking of interrogative versus declarative sentence mood. One of our core hypotheses is that the essential underpinnings of the question-assertion distinction are best derived from its grammaticalization in the form of declarative and interrogative sentences: the universal similarity of

their forms shows that there must be a considerable common denominator, the universal availability of different forms shows that there must also be a specific difference.

A second core hypothesis is that the common formal denominator of interrogative-declarative minimal pairs codes a common denotational denominator, namely a more or less shared propositional content. For example, whether/that the door is open is the common propositional content of the interrogative (1a) and the declarative (1b):

(1)   a. Is the door open?
       b. The door is open.

Different views have been advocated concerning the division of labour between the illocutionary force and the propositional content in the question-assertion distinction. Searle, for instance, assigns at least polar questions the same content as their assertive counterparts, disregarding thus the whether/that distinction (Searle 1969: 31), whereas we agree with Ginzburg and Sag (2000: 84) that this view is untenable and that the whether/that distinction reflects a difference in propositional content as well.

The next section contains a proposal for modeling both the common denominator of and the specific difference between the propositional contents of questions and assertions.

2.   Conceptualizing propositional contents

2.1. Cognitivized Austinian propositions

A cognitively plausible concept of a proposition has to meet at least four criteria of adequacy: (a) It must fit as a relatum with all so-called propositional attitudes, i.e. mental relations like assuming, doubting or regretting, (b) it must have a representation in the mind of every subject of such an attitude, (c) it must be something that can be judged as true or false, (d) it must be something that can be built on the basis of both non-linguistic and linguistic input. Next we outline a concept of proposition and propositional content that meets these criteria.

Suppose you enter a room in which some other person, lets call her Eve, is sitting, looking away from you, and you close the door silently behind you. In such a situation you will probably believe that the door is closed. So

the perception of a situation is able to activate beliefs. Let us therefore call situation perceptions in this role *belief activators of the first kind*. Beliefs can in turn activate other beliefs. Activation of your first belief together with your belief that nobody enters through a closed door may lead you to activate the additional belief that nobody is behind you. Let us call other activated beliefs in this function *belief activators of the second kind*. And use of language may of course also activate beliefs. If Eve says in that situation that the door is open this could activate your belief that the door is open, so we can call assertions *belief activators of the third kind*.

However, activation of the belief that the door is open in your mind is impeded by your activated belief that the door is closed, since openness is incompatible with closedness. Although it is plausible to assume that people may have inconsistent beliefs, it is not plausible to assume that they have inconsistent activated beliefs, so there is a conflict: The belief activator of the first kind has produced a result that either ousts or is ousted by what the belief activator of the third kind aims at. Since two beliefs are inconsistent if and only if their propositional contents are inconsistent, and the latter means that they cannot be possibly both true at the same time, the question of truth arises.

More than half a century ago, the father of modern speech act theory made a proposal that seems worth reconsidering: In his paper *Truth* J. L. Austin (1950) suggested that the question of truth arises whenever a specific situation (his words are "historical situation"), a situation token, is confronted with a situation type. Such a confrontation takes place whenever a declarative sentence of a language *L* is uttered, because according to Austin the demonstrative conventions of *L* specify the situation token which is correlated with the utterance act, and the descriptive conventions of *L* specify the situation type correlated with the uttered declarative sentence. The relevant utterance is true if the thus given situation is of the thus given type, else it is false.

Equipped with this intuition we return to the situation sketched above and do a little mind reading. When you enter the room you have a representation of your current situation in your mind, consisting of you and Eve and the room with its door and what just happened. If you attend to this situation then it is what we will call a *target situation* of your current mind state. Target situations are in general not attentionally flat, but contain more and less salient elements. Let us assume that the most salient element in your target situation is the door you just closed, and let us call this the *centre* of your target situation. We may safely assume that the centring of a target

situation is correlated with an activation of the corresponding type, or rather its mental representation, a phenomenon we shall call *centre-based type activation*. So your target situation with its closed-door centre is a closed-door-situation token represented as being of a closed-door-situation type, and your corresponding belief has a propositional content that is true (for you) by centre-based type activation, i.e., as it were, by definition.

2.2. Two kinds of propositional contents

Suppose next that you are confronted at this moment with Eve's utterance: *The door is open*. The descriptive conventions of English tell you that she is evoking an open-door situation type and the relevant demonstrative conventions (or something similar) tell you that she is attending to the same target situation that you are. Starting from the assumption that she is telling the truth you do the inverse of what you did a minute ago, instead of a centre-based type activation you do a type-based centre activation, you activate a mental representation of the unique door in the target situation as open. And this clashes with the centre representation that was active before: only one of the two centrings of the target situation can be the real one. Either Eve's assertion has a propositional content that consists – in line with what you remember – of a closed-door centre and an open-door type, and that therefore is false, or it has a true propositional content with an open-door centre, and therefore your representation of the current target situation is mistaken. In the former case a natural reaction would be to utter *No*, in the latter case *Really?*.

Now suppose that instead of the declarative sentence mentioned above Eve utters the interrogative: *Is the door open?* It seems reasonable to assume that again the descriptive conventions of English entail that she is evoking an open-door situation type and the relevant demonstrative conventions (or something similar) tell you that Eve is attending to the same target situation that you are. But now the question of the truth of what Eve is saying does not arise and therefore no clash between centre representations can occur. A natural way to account for this asymmetry is by assuming that the propositional content of an interrogative is not a proposition, but something similar, which will be called a *near-proposition*, a combination of an underspecified situation centre with a situation type, where the underspecification relates exactly to the given type. We will call such an underspecified situation centre an *issue*. So the issue that corresponds to the

open-door situation type in our target situation is a door with an unspecified degree of openness where the open state is only adumbrated as a default possibility. If you compare this issue, which has been activated by Eve's interrogative utterance, with the representation of the target situation in your mind, you can unify it with the given centre and obtain a closed-door centre, which, combined with the situation type activated by Eve's interrogative utterance, would yield a false proposition. So, if you want to give a true answer, you cannot combine your closed-door centre of the target situation with Eve's open-door type into a proposition, you have to choose the negative counterpart of an open-door type and utter *No, the door is not open* or something equivalent.[2]

In order to have a term for what is described by a situation type in a target situation irrespective of its being a centre or an issue we will call such a thing a *situation core*. According to the view just outlined the main function of those sentence mood indicators that mark the declarative-interrogative distinction is to indicate if the propositional content is to be seen as a full proposition or as a near-proposition, in other words, whether the situation core it describes is a centre or an issue. Under appropriate additional assumptions the prototypical properties of assertions and questions can be derived from this basic difference in a quite straightforward way (cf. Zaefferer 2004, 2006, 2008; Truckenbrodt 2004).

3. Processing interrogatives and declaratives

In order to test the conceptualizations outlined above, it is necessary to have a clear idea of the way interrogative and declarative sentences are processed. So far, our considerations have been universal and therefore the specific differences between the ways sentence mood is marked in different languages could be neglected. As soon as processing considerations enter the picture this is no longer possible. Since mood marking tends to occur in the periphery of sentences, two main types can be distinguished: forward typing languages such as English, French, German and Polish, and backward typing languages such as Chinese, Japanese and Korean. When a user of a forward typing language reconstructs the propositional content of an interrogative or declarative, she knows already whether the described situation type is to be combined with a centre to form a proposition, or with an issue to build a near-proposition. This is not the case with the processing of sentences where the mood is only indicated *ex post*. Presumably, in such a

language the default strategy is to first construct a proposition and thus to assume a centre and then either to see this hypothesis confirmed or else to weaken the centre into an issue and thus to change *ex post* the proposition into a near-proposition.

Therefore, in addition to the content-related investigation of the question-assertion distinction the present study also probes the form-related question of how these two types of marking sentence mood affect the processing of questions and assertions. Accordingly, the experimental design includes two parallel tests, one for a forward typing language and one for a backward typing language. As an instance of the former we chose German, whereas Japanese was chosen to represent the latter type.

4.   Experiment

To investigate differences in the representation and processing of questions and assertions in Japanese and German, we presented native speaker participants with pictures of a pear and an apple side by side. Both the colours of the objects and the side they appeared on were varied between trials. After each picture a question or an assertion that referred to one of the two objects and related to its colour was presented via a written declarative or an interrogative sentence, i.e. a translation counterpart of a sentence like "Now the pear is yellow" and "Is the pear now yellow?". The participants' task was to respond as fast and as accurately as possible with a true assertion by pressing either a previously designated "yes" or a "no" key on the computer keyboard.

This design allowed us to investigate both effects of form and of content of questions and assertions in Japanese and German speakers. Based on experience with previous monolingual studies (Zaefferer and Bach 2006) we were looking mainly for two kinds of effects. First, with regard to the match or mismatch between the visually presented scene and the linguistic description we looked for what could be called "gullibility effects", the possibility that assertions are sometimes blindly believed, i.e. in case of a mismatch the more recent information provided by a declarative sentence "wins" and is erroneously assumed to accord with the picture, yielding a "yes" response where a negative response would be required. This kind of error is of course less likely with interrogatives, for which the more recent information is only given in a tentative way. In principle such an effect could occur with both forward typing and backward typing languages.

However, we had to reckon also with the possibility of a difference between the two groups because of the different order of steps in the interpretation process: when interpreting the forward typing German sentences the participants first saw the sentence mood information and thus they knew whether to build a centre or an issue even before they could identify the centre of the recalled target situation. By contrast, faced with their backward typing sentences the Japanese participants first saw the topic and predicate expression and thus could identify the core of the recalled target situation; it is not before the final interrogative marker was reached that they knew whether the core of the described situation was to be interpreted as a centre or an issue.

Second, with regard to the position of the centred object in the scene, we expected spatial compatibility effects, that is, manifestations of the Simon effect (Simon and Rudell 1967; Simon 1969). The Simon effect refers to the observation that ipsilateral responses, ones that occur on the same side as an eliciting stimulus, are faster and more accurate than contralateral responses. In our case, the potential for such laterality effects, as we will call them, results from the two facts that (1) the sentences referred to objects that appeared either on the left or the right, and (2) that the participants' "yes" and "no" responses were given with either a left or a right key on the computer keyboard. Thus, the laterality effects provide a measure of the extent to which participants activated the complete prior target situation including the spatial configuration of the objects in them rather than just its centre when making judgments about their match or mismatch with the linguistically activated types and their corresponding cores. Although this is a purely content-related issue, form could play a role here as well, since at the moment when reference (apple versus pear) and predication (green versus yellow) are understood and the participant can start to decide about match or mismatch, the processing of a German sentence requires the construction of either a centre or an issue, whereas with a Japanese sentence this decision must either be postponed or, as assumed above, be made preliminarily in favour of a centre, and later revised with interrogatives. German participants have to recall the picture of the target situation, which is no longer visible, say a yellow pear to the left of a green apple, and try to match it with the core they can build from the subject, say *Birne* 'pear', and predicate, say *grün* 'green', of the current sentence. If this sentence is interrogative and thus the core is an issue, i.e. a pear with an underspecified colour except that green is tentatively assigned as the default possibility, the matching process will be asymmetric, because underspecification

means an informational vacuum that exerts a mental pull on its partner, the picture with a yellow pear on one side that has to be reactivated. If on the other hand the first two words mark the sentence as declarative, the core is not an issue, but a centre, i.e. a pear with a specified green colour, and the matching process will be more symmetric: The picture with a yellow pear on one side will also be recalled, but with a lesser degree of intensity and therefore, according to our assumptions, with a weaker laterality effect. In other words, if questions in particular lead to a stronger pull towards reactivating the previously seen image (as opposed to the creation of a fully specified centre in the case of assertions), then the Simon effect should be stronger for questions than for assertions. And if the Japanese sentence-final interrogative particle *ka* causes only an *ex post* weakening of specified cores to underspecified ones in Japanese participants, this asymmetry should be less pronounced in their language.

4.1. Method

4.1.1. Participants

Forty participants, most of them students at the University of Munich, took part in the experiment, 15 of them male. They ranged in age from 22 to 45 years. Half of the participants were Japanese and performed the Japanese version of the experiment, and the other half were German and performed the German version of the experiment. All participants had normal or corrected-to-normal vision. They received payment for their participation. The data of one Japanese participant could not be used due to a computer error.

4.1.2. Material and apparatus

The stimulus set consisted of four images (identical for the German and Japanese group) and eight different sentences (written in Japanese or German for Japanese and German participants, respectively). The images consisted of photographs of a pear and an apple presented side by side before a black background. The images varied with regard to two properties. First, either the pear was yellow while the apple was green, or vice versa. Second, either the pear appeared on the left and the apple on the right, or vice versa.

The linguistic stimuli were either declarative or interrogative sentences, assumed to be understood as assertions and questions, respectively. They referred either to the pear or the apple and they described this object either as green or as yellow. German participants were presented with German sentences such as those in (2), while the Japanese participants were presented with the Japanese counterparts of these sentences (3) (COP stands for copula, TOP for topic marker, INT for interrogative particle):

(2) a. *Ist   jetzt   die   Birne   grün?*
         COP   now   the   pear   green
         'Is the pear green now?'
     b. *Jetzt   ist   die   Birne   grün.*
         now   COP   the   pear   green
         'Now the pear is green.'

(3) a. *ima   younashi   wa   midori desu   ka*
         now   pear   TOP   green   COP   INT
         'Is the pear green now?'
     b. *ima   younashi   wa   midori desu*
         now   pear   TOP   green   COP
         'Now the pear is green.'

Note that by using the *jetzt*-construction in the German sentences, word order was controlled so that the forward typing mood marking was done already and only by the relative order of the first two words (apart from the punctuation). Critically, the words relevant for the task – the name of the topic object and its colour – appeared in the same positions, irrespective of whether they were part of a question or an assertion. For Japanese speakers, word order was identical for questions and assertions because questions are indicated by placing the interrogative particle *ka* at the end of the sentence.

Stimulus presentation was controlled by PsyScope Build 51 (Cohen et al. 1993) run on a MacBook 2,1. Responses were recorded from the computer keyboard, with the "p" key designated for "yes" responses and the "q" key designated for "no" responses.

4.1.3. Procedure and design

Upon entering the lab, participants received a short computer-driven instruction and performed 16 training trials. The experiment proper lasted for

about 15 minutes and consisted of three blocks of 64 trials each (separated by a short pause). In each block, the order of trials was randomized, and all 32 combinations of eight sentences and four images appeared at equal rates. Thus, in an equal number of trials the sentence was a question or an assertion, and an equal number of trials required a "yes" and a "no" response.

The course of each trial was as follows: First, the visual stimulus appeared on the screen for 1500 ms. After an inter-stimulus interval of 300 ms, the linguistic stimulus – either a question or an assertion – appeared. This stimulus remained on the screen until a response was given. The upper time limit for responding by pressing one of two keys was 3000 ms. If the judgment was correct, the next trial started after an inter-trial interval of 400ms. If an error was committed, or the response was too slow, a short error-message, either "Too slow!" or "Error!" was displayed.

4.2. Results

The response time and error data were analyzed separately with respect to polarity effects and with respect to laterality effects. For the analyses of reaction times (RTs), only trials in which the participants had delivered a correct judgment were included in the analysis of reaction times. Trials in which the participants pressed the wrong button or did not react in the given reaction time interval of 3000 ms were excluded. For the analysis of error data, trials in which participants did not respond in time counted as errors.

4.2.1. Polarity effects

The data were analyzed separately for the Japanese and German groups. For each group, the RTs and error rates were entered in a 2 x 2 repeated measurements ANOVA with the factors *mood* (declarative versus interrogative) and *polarity* (picture-description-match and "yes" response required versus picture-description-mismatch and "no" response required) as within-subjects factors. Figure 1 shows the RTs and error rates in the two groups, with Japanese speakers in the upper panel and German speakers in the lower panel.
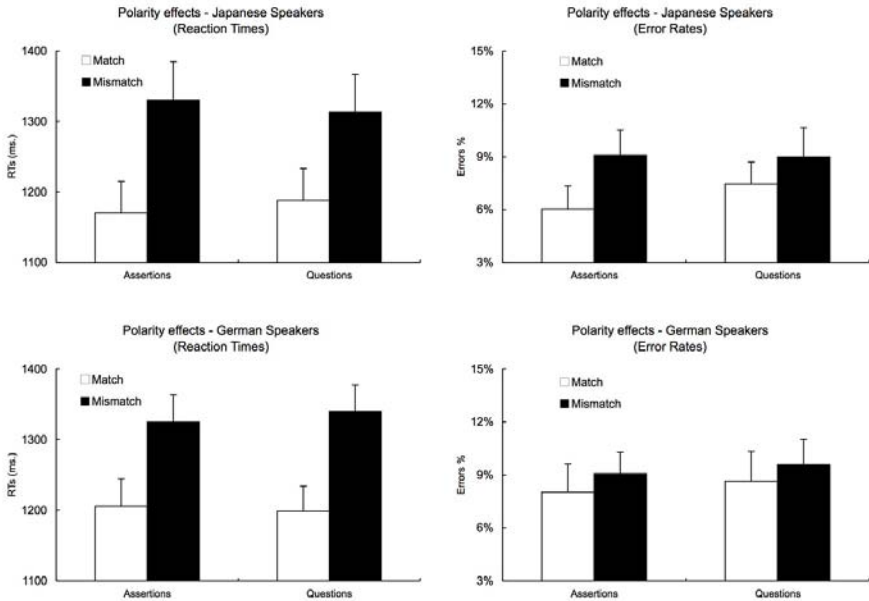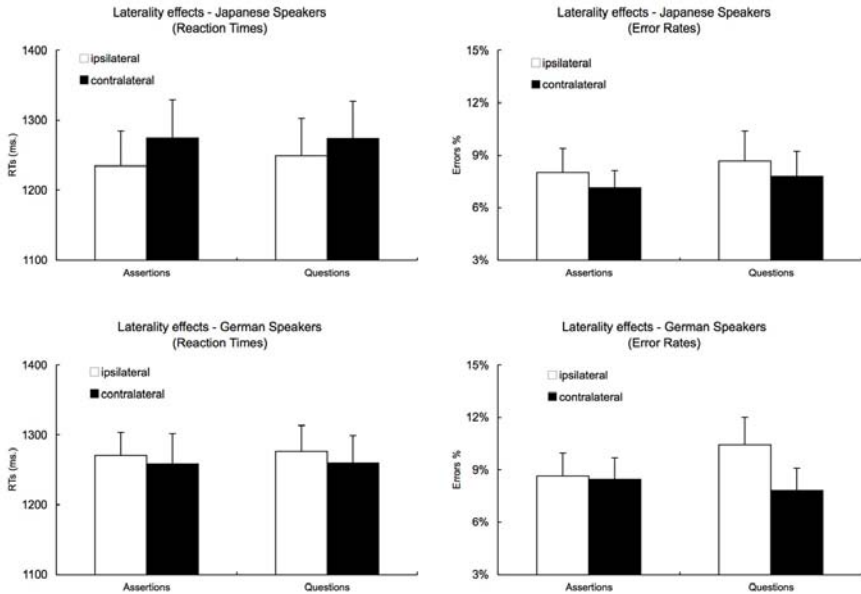
Figure 1. Reaction times and error rates analyzed with respect to polarity effects. The left panels show the reaction times and the right panels show the error rates. The upper panels show the data of the Japanese subjects and the lower panels show the data of German subjects. In both panels, the white bars represent the data for matches and the black bars represent the data for mismatches. Error bars show the standard error of the mean.

The analysis of the RTs in the Japanese group did not show a main effect of mood ($F[1,18] < 1$), indicating that overall questions and assertions were processed equally fast. There was, however, a main of effect of polarity ($F[1,18] = 35.2$, $p < .001$), showing that "yes" responses were generally given faster than "no" responses (remember that only correct responses are counted). Critically, the interaction of mood and polarity was highly significant ($F[1,18] = 6.8$, $p = .018$), reflecting that the speed increase for "yes" compared to "no" responses was greater for assertions than for questions. Analysis of the error data replicated the main effect of polarity ($F[1,18] = 3.9$, $p = .062$), but did neither reveal a main effect of mood ($F[1,18] < 1$) nor an interaction of mood and polarity ($F[1,18] < 1$). Numerically, however, the error analysis showed the same pattern as the RTs,

with a stronger accuracy increase for "yes" compared to "no" responses for assertions than for questions.

For the German speakers, analysis of RTs only showed a main effect of polarity, reflecting faster responses for "yes" than for "no" responses ($F[1,19] = 46.9$, p < .001). The main effect of mood was not significant, and polarity and mood did not interact (both, $F[1,19] < 1$). No effect was significant in the analysis of the error rates (all $F < 1$). Thus, in contrast to Japanese participants, Germans did not show a bias towards responding affirmatively to assertions compared to questions. Indeed, when entering the RT data of both groups into a polarity by mood by group ANOVA, the critical interaction of group by mood was marginally significant ($F[1,19] = 3.5$, $p = .068$), confirming that Japanese and German speakers differed in their sensitivity to differences in illocutionary force between questions and assertions.

4.2.2. Laterality effects

To assess differences in the kind of propositional content between questions and assertions, the RTs and error rates were entered in a 2 x 2 repeated measurements ANOVA with the factors *mood* (declarative versus interrogative) and *laterality* (ipsilateral versus contralateral: the centred object in the picture and the key for the required response were on the same side/different sides). The data were again first analyzed separately for the Japanese and German subjects.

For the Japanese group, the analysis of the RTs did not reveal a main effect of mood and no interaction of mood and laterality (both, $F[1,18] < 1$). There was, however, a main effect of laterality ($F[1,18] = 6.2$, $p = .023$), reflecting that responses were faster when the reference object was presented on the same side as the required response. The analysis of the error data neither showed a significant effect of laterality, mood and no interaction of these factors (for all, $F[1,18] < 1$), also failing to reveal significant differences in the processing of questions and assertions. Thus, in Japanese subjects, the laterality effects did not indicate differential activation of prior scenes between questions and assertions.

For the German group, the analysis of RT data neither showed a significant main effect of laterality or mood and no interaction of these factors (all, $F[1,19] < 1$). The analysis of the errors did not reveal a main effect of mood ($F[1,19] < 1$). There was, however, a marginally significant main ef-

Figure 2. Reaction times and error rates analyzed with respect to laterality effects. The left panels show the reaction times and the right panels show the error rates. The upper panels show the data of the Japanese subjects and the lower panels show the data of the German subjects. In both panels, the white bars represent ipsilateral responses and the black bars represent contralateral responses. Error bars show the standard error of the mean.

fect of laterality ($F[1,19] = 4.0$, $p = .061$) that was qualified by a marginal mood by laterality interaction ($F[1,19] = 3.2$, $p = 0.089$). These data indicate that, in Germans, laterality effects were evoked, but that they differed between questions and assertions. Indeed, whereas for assertions no laterality effects were statistically detectable ($p = .82$), for questions participants made more errors when the reference object was presented on the same side as the required response ($p < .018$). We therefore suggest that, for Germans, in contrast to Japanese subjects, questions triggered the reactivation of the prior scenes, but assertions did not. Note, however, that a between-groups-comparison failed to reveal a significant interaction between laterality, type, and language ($F[1,14] = 15.4$, $p < .22$). This was, however, mostly due to one subject in the Japanese group showing a highly irregular pattern of data, with overall good performance (below 10% of errors) in all but one

condition (33% of errors). If this subject is excluded, the three way interaction is obtained ($F[1,19] = 3.2$, $p < .089$).

5. Discussion

We explored the basic difference between questions and assertions as expressed by interrogative and declarative sentences by investigating the different ways they are processed. To take into account form effects resulting from initial versus final marking of sentence mood we chose native speakers of Japanese (backward typing) and German (forward typing) as participants, and presented the sentences in their native languages.

   The experiment provided two important results. First, we found that the difference between the interrogative and the declarative sentence mood of the displayed sentence strongly affected how its content was processed in both language groups. This was the case even though this difference was irrelevant to the participants' task and albeit in neither the German nor Japanese version the corresponding markers affected the words that were relevant for the task, i.e. the referring nominal and the colour adjective. The finding that sentence mood nevertheless had robust effects on processing therefore supports the assumption that the question-assertion distinction is fundamental to both languages and has a direct effect on the cognitive representation of the sentences' content.

   The second important result was that sentence mood affects processing differentially in forward and backward typing languages (here: German and Japanese).

   From the theory of cognitivized Austinian propositional contents outlined above we predicted two ways in which sentence mood could affect processing. First, if an interrogative sentence is processed, the given situation type is related to an underspecified situation core, in the present case an only tentatively coloured fruit, and this should lead to a stronger "pull" towards reactivating prior content, the colour of the fruit in the recalled scene than in the processing of a declarative sentence, where the representation of a fully coloured fruit is activated. Second, if the underspecified situation core evoked by an interrogative is matched with the recalled scene, no real conflict can arise, whereas the fully specified situation core activated by a declarative may be in sharp conflict with the recalled scene. Evidence for both effects was found, but remarkably, which effect was most prevalent depended on the position of the marker of the question-

assertion distinction before the critical content-descriptive words (in German) or after (in Japanese).

We took different response times with respect to interrogatives and declaratives as an indicator for absence versus presence of conflict in mapping issues or centres to prior content. As others before us, we found that affirmative responses were generally given faster than negative responses (e.g. McKinstry, Dale, and Spivey 2008; Bach et al. 2005). Interestingly, in Japanese speakers this difference was reduced for questions, suggesting less conflict, consistent with the idea that questions only activate an issue, an underspecified situation core. In addition, the bias in error rates of Japanese speakers towards affirmative responses when the sentence did not match the picture was (subsignificantly) greater for assertions than for questions, i.e., they solved the conflict resulting from a mismatch in favour of the linguistic information more often when it was presented definitely as opposed to tentatively. In sharp contrast, German speakers did not show differences in response to mood distinctions. They found it equally easy to respond affirmatively or negatively to questions and assertions. We ascribe this difference to the greater recency of the mood information in the backward typing Japanese sentences compared to the fading effect of the corresponding information in the forward typing German counterparts.

We interpret Simon-type laterality effects as indicating the degree of reactivation of prior content. That is, if the core activated by a sentence is underspecified, as is the case with interrogatives, then the prior scenes – including their spatial layout – should be reactivated more strongly than if the activated core is fully specified.

If underspecified cores exert a stronger pull towards reactivating the recalled picture, the position of the reference object in it should affect left and right hand responses to a stronger extent with interrogatives than with declaratives. Here the pattern between German and Japanese speakers was reversed. Whereas German speakers did show laterality effects for questions but not for assertions, as predicted, Japanese speakers did not show a difference in laterality effects. We attribute this to the *ex post* nature of the activation of the different kinds of propositional contents in Japanese: here the referring and predicating expressions come first and activate a full proposition with a fully specified core in both cases, preventing thus laterality effects, and only if a final *ka* turns the sentence into an interrogative, the propositional content is weakened to a near-proposition. But at this time it seems to be too late for a laterality effect to take place.

Two questions need to be addressed by further studies. First, one open question is why the laterality effects observed for the German participants were inhibitory. Typically, ipsilateral responses are rather more than less fast compared to contralateral responses (e.g. Simon and Ruddell 1967; Simon 1969). However, since such reversals have been observed before, especially if response times are very long (e.g. Hommel 1993), and particularly for tasks that require same/different judgments (Vietze 2007), as was the case here, this does not mitigate the results obtained in our study.

Further studies are also required to address the question whether the observed differences between the two languages might not only reflect differences in how the languages represent the question-assertion distinction, but also be evidence of cultural differences between the Japanese and German participants. Such a cultural influence is not likely to affect the laterality effects obtained in the experiment, because the processing requirements that give rise to these effects are identical for both cultures (for a review of determinants of laterality effects, see Vietze 2007; Hommel 1993). Cultural differences might, however, reinforce the "gullibility effects", that is, the stronger tendency of the Japanese participants to answer assertions affirmatively. For instance, it has been observed that Japanese participants tend to be reluctant to disagree with people in higher positions (Walkinshaw 2007). Such a cultural bias might have lead to the greater difficulties of the Japanese speakers in responding negatively to assertions observed here. Note, however, that in the experiment participants were explicitly instructed to react truthfully, received negative feedback for erroneous responses, and performed the experiment for many trials, influences, which should mitigate such habitual cultural response tendencies.

Nevertheless, further studies are needed to tease apart the proportion of linguistic and cultural influences on the processing of questions and assertions.

In sum, the present study demonstrated that speech act theoretical issues lend themselves well to investigations with cognitive psychological methods. We derived hypotheses from speech act theory about the cognitive representation of questions and assertions to illuminate real world sentence processing. The results provide new insights into how actual sentence interpretation arises from an interplay of sentence form and representational content during processing.

Notes

1. We are grateful to Hans-Martin Gärtner, Susanne Handl, Claudia Mucha, Hans-Jörg Schmid, and Elmar Thalhammer for helpful hints, comments and criticism. All the remaining errors are our own fault and shouldn't be blamed on them.
2. This fits with the assumption that negative assertions are processed via activation of the meaning of their positive counterpart: Kaup, Zwaan, and Lüdtke (2007) provide evidence that an understanding of *The door is not open* is arrived at after activating the concept of an open door.

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