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Semantic profiles of antonymic adjectives in discourse

Abstract: This study has two goals: First, to give an account of the semantic organization of individually used antonymic adjectives in discourse and second, based on those findings and previous work on antonymic meanings, to contribute to a comprehensive theoretical account of their representation within the framework of Cognitive Linguistics. The hypothesis is that the members of the pairs are used in the same contexts and in the same type of constructions, not only when they co-occur and are used to express binary opposition as shown in previous studies, but also when they do not. The manually coded corpus data from the BNC are analyzed along four semantic parameters: (i) the configuration of the adjectives in terms of gradability, (ii) the way they modify the nominal meanings, i.e., attributively or predicatively (iii) the meaning type of the modified nouns, and (iv) the status of the constructions with respect to whether their meanings are what we refer to as "basic", metaphorical or metonymical. Correspondence analysis technique is used to identify similarities and differences on the basis of the totality of the data. As predicted, our findings confirm a high degree of pairwise similarity – but also some differences. On the basis of these results, it can be argued that the long-standing controversy within Structuralism between proponents of the co-occurrence hypothesis and the substitutability hypothesis in antonym research is a non-issue.

Keywords: opposition, gradability, nominal meaning, metaphor, metonymy, literal, scalar, corpus, adjectives, English, semantics, noun, attributive, figurative, syntagmatic, paradigmatic, substitution hypothesis, co-occurrence hypothesis

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1 Introduction

Recent research has established that there are a number of opposable adjectives that have special status as canonical antonyms, in which case antonym canonicity is defined as the degree to which antonymic word meanings are entrenched in memory and conventionalized as pairs in language.[1] Antonymic pairs that have been shown to be strongly canonical are expressive of properties of salient dimensions. For instance, *thin* and *thick* evoke opposite properties of the dimension of THICKNESS, as do *bad* and *good* of MERIT. Corpus-driven investigations of English, Swedish and Dutch have demonstrated that canonical antonym pairs are frequent in language as individual words, and they co-occur pair-wise significantly much more often in the same sentence than other possible antonyms and other semantically related word pairs (Willners 2001; Paradis et al. 2009; Lobanova et al. 2010; Willners and Paradis 2010; Lobanova 2012). Moreover, the members of these pairs elicit one another strongly in elicitation experiments. They are assessed to be excellent antonyms in judgment experiments, and they have facilitating effects on each other in psycholinguistic and neurolinguistic experiments (Paradis et al. 2009; Paradis and Willners 2011; Crutch et al. 2012; van de Weijer et al. 2012; van de Weijer et al. 2014).

In spite of this recent boost in research on antonymy, there are still some outstanding problems that need to be addressed in order to complete the picture. One of them concerns whether these strongly opposable antonymic adjectives are used to modify the same meaning structures also when they occur individually in text and discourse, i.e., not only when they are actually used to express opposition as is the case in most of the corpus studies above but also *in absentia* of their partners. This is exactly what this article is about. It carries out a large detailed corpus-based analysis of the usage patterns of 42 individual adjectives in the *British National Corpus* (the BNC). These adjectives have all been deemed to be strongly opposable in the above-mentioned experiments and corpus studies.

Theoretically, there has been a long-standing controversy between advocates of the *substitutability hypothesis* and the *co-occurrence hypothesis*. These different views hark back to the two different approaches to lexical relations in language within the framework of Structuralism, namely the paradigmatic and the syntagmatic approaches. The paradigmatic approach states that two words are antonyms if they can *substitute* for one another in the same slot in a chunk of text, say a sentence (e.g., Lyons 1977; Cruse 1986). Accordingly, the relation of

1 It should be noted already here that we use the term antonym as a general term for lexical items that are used as opposites in text and discourse (Jones et al. 2012: 2).

antonymy is a paradigmatic (vertical) relation. Initially, this was a way for the Structuralist analysts to define antonymy at the same time as it was used as a tool for identifying antonyms in a manual fashion based on constructed examples. With the advent of an interest in real language use aided by computational techniques, the empty-slot testing of substitution was replaced by investigations of words in large corpora of text. The prediction for the use of paradigmatically related words was no longer that they could substitute for one another in the same sentence but that they have the same close neighbors, i.e., words that occur before or after the paradigmatically related words (Schütze and Pedersen 1993; Sahlgren 2008). Moreover, research using computational methods also took an interest in relations between words at the syntagmatic level and showed that one important characteristic of antonyms is that they co-occur at very high frequencies within the same sentence. In particular some pairings, more precisely the ones that we refer to as canonical pairings, co-occur much more often than other antonymic pairs and also than other related pairs, such as synonyms. Syntagmatic associates are neighbors of one another in actual text and they co-occur in sequence (horizontally) (Charles and Miller 1989; Justeson and Katz 1991; Willners 2001, Mohammad et al. 2013). This is known as the co-occurrence hypothesis and has been shown to hold good for antonymic words too (Jones et al. 2007; Murphy et al. 2009; Kostić 2011; Lobanova 2012).

As already stated, this article investigates the individual contextual use of a set of adjectives that have previously been deemed to be particularly strong lexical semantic relations and that are known to co-occur close to one another in text. Unlike the investigations carried out to test the co-occurrence, this study puts the focus on the semantics of the close neighbors of the individual adjectives in order to determine whether they are in fact used to modify the same meaning structures also when they are not used as antonyms. Unlike corpus-driven paradigmatic work, this study involves manual analysis of each of the uses. The purpose is to chart the semantic environment and to shed new light on the paradigmatic-syntagmatic debate from a usage-based, Cognitive Linguistics perspective. We argue that the outcome of this study resolves the controversy between the above two approaches as a non-issue. Instead of being relational as is the case in Structuralism, meaning in Cognitive Linguistics resides in actual use and is substantial. Rather than pointing in two different directions, the paradigmatic and syntagmatic approaches actually converge in discourse. The domains in which the adjectives are instantiated are what matters and the two approaches are just different perspectives on antonym use and different ways of operationalizing the relation of binary opposition in discourse.

The procedure is as follows. In Section 2, we provide a short presentation of our framework and a description of the meanings of the words and the word

combinations of this study. Section 3 presents the theoretical foundation for the coding schema, followed by a description of the data, the method and the mode of procedure in Section 4. Section 5 makes use of the occurrences of *thin* and *thick* in the corpus to concretize the coding conventions in order to facilitate the task of the reader. The results of the corpus study are presented in Section 6 and further discussed in Section 7. The theoretical implications are presented in the conclusion, Section 8.

2 Adjective meanings and their combining nominal meanings

The meaning structures of antonymic adjectives, such as the ones under investigation in this study, are opposite properties of meaning *dimensions*. A dimension is defined as a simple conceptual structure comprising two opposing poles, which may be expressed by antonymic words in language. Dimensions and their properties are independently defined (Gärdenfors 2000; Paradis 2005, 2016) and not mere parts of more complex concepts or interconnected entities of a region, as in Langacker (1987: 197–198).[2] More complex concepts are typically based on several separable domains in conceptual space. Examples of such conceptual structures are nominal meanings such as 'book', 'office', 'discussion' and 'death'. In the context of our adjectives, we may say that there is a property THICK expressed as *thick* in English. Speakers' understanding of *thick* is profiled against the contentful dimension of THICKNESS and the configuration of SCALE. It evokes a meaning within the 'having-more-than-average-of' range along the UNBOUNDED SCALE of THICKNESS (Paradis 2001). It only obtains its discursive reading when it is used in human communication as a modifier of nominal meanings. *Thick* in combination with *book*, *wood* and *skin* is different from *thick* in combination with personality traits, as in 'he thinks I am thick', and also from 'thick forest', 'thick voice' or 'thick jam'.

(1) *The* book *is* thick.

(2) *Her* voice *was* thick.

2 Langacker (1987: 197–198) does not provide definitions of concepts and properties. He defines nominals as THING, i.e., as a set of interconnected entities (a region) in some domain. The interconnections, which are either temporal or atemporal relations, are defined in relation to some entity in a region.

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(3) He *is so incredibly* thick – *he doesn't understand anything*.

(4) *Put all the* thick books *in the box to the left and the thin ones in the one to the right*.

When the discourse interpretive function of the adjective is one of description, as in (1), (2) and (3), *thick* is profiled against a SCALE along the dimensions of THICKNESS, HUSKINESS, and INTELLIGENCE, evoked against the more complex conceptual domain structures BOOK, VOICE, PERSONAL PROPENSITY. When used as a classifier, as in (4), *thick* is still based on the contentful notion of THICKNESS, but it is not primarily profiled as a scale structure but instead on the basis of a definitive class of THING deemed to be THICK. In (4), *thick* is not gradable at all, rather its function is to profile the class of thick books. Like contentful and configurational meaning structures, descriptive and classifying functions are not inherent structures of word forms, but interactional functions evoked in discourse.

Our approach to adjectival meanings is a conceptual combination view that states that the interpretation of adjectives derives from its integration with nominal meanings (see Section 3 where a more detailed discussion of our approach is provided). It accords with Murphy and Andrew (1993), Murphy (2002) and Rakova (2003). Murphy and Andrew (1993) contrast the conceptual representation view with what they call the polysemy view according to which the interaction of adjectival and nominal meanings is a matter of selecting one of two (or more) different, already set senses. Using examples such as *fresh fish* and *fresh shirt*, they argue that *fresh* in those two examples evoke two different senses: 'not frozen' and 'unsoiled' respectively due to their conceptual integration with the nominal meanings. The alternative explanation for the effect of context in relation to adjective meanings that they (and we) argue against is the polysemy view, which involves the selection of two different already set senses of *fresh*. As is well known, the notion of sense is very problematic in itself, and there is no straightforward and uncontroversial way of discriminating between senses and mere readings. It may well be the case that Lyons (1977: 554) was right when he pointed out that the whole notion of discrete senses may be ill founded. In the same spirit, Cruse (1986: 71) states that there "are cases where variant readings of single lexical forms would seem to be more appropriately visualized as points on a continuum – a seamless fabric of meaning with no clear boundaries". This is a description he has modified to some extent after abandoning Structuralism for Cognitive Semantics (Cruse 2002).

Our approach to meaning in language accords with the conceptual integration approach, in which all the readings of a word make up a word's total meaning in the language users' minds. We refer to this as a word's use potential

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(Paradis 2005, 2016). In the individual usage events, only a portion of the total use potential of a lexical item is evoked. The direct mapping between lexical items and conceptual structure is constrained by encyclopedic knowledge, conventionalized mappings between lexical items and concepts, and conventional modes of thinking in different contexts and situational frames. In cognitive approaches to meaning, all linguistic expressions are profiled in relation to a "base" (Langacker 1987), a "frame" (Fillmore 1982), or an "idealized cognitive model" of a situation (Lakoff 1987). All these constructs represent presupposed information available to speakers in the act of communication, and meanings emerge as linguistic communication unfolds. It is important to note that meanings are thus not inherent in the lexical items as such, but they are evoked by lexical items and their contextual frames (Fillmore 1982; Boas 2008; Paradis 2012). In order to portray meaning in language, Cruse (2002) makes use of a spatial metaphor, describing all readings as groupings separated by boundaries in conceptual space. A word's use profile is not an uninterrupted continuum, but rather discontinuously distributed clusters, showing different degrees of cohesiveness and closeness. Between the clusters are regions of emptiness or sparsely populated areas. These areas are the sense boundaries that separate clusters of readings that make up senses and distinguish them from others.

3 Basic assumptions and theoretical framework

This section offers a short description of the categorization principles used for the analysis of the corpus data in this study (described in Section 4), and the modelling framework of *Lexical meaning as ontologies and construals* (Paradis 2005, 2016, henceforth LOC). The basic assumption of the framework is consistent with the basic assumptions of Cognitive Linguistics more generally. First, lexical meaning is firmly grounded in how we as humans both perceive and understand the world around us. The research is usage based both in the sense that it promotes investigation of "real" language use (such as spoken and written communication and experiments of different kinds) and with reference to the nature of language (i.e., how languages are acquired, how they develop and how they change in the contexts where they are used in social communication; cf. Traugott and Dasher 2005; Tomasello 2003, 2008). People's ways of expressing themselves are functionally motivated and spring from communicational needs in social intercourse and the settings of the symbolic structures, i.e., the form–meaning pairings. Successful communication in different contexts emerges from the speaker's intention and the addressee's wish to interpret an expression in a relevant way in order to obtain socially viable mappings between words and concepts. These fun-

damental assumptions presuppose that meanings of lexical items are dynamic and sensitive to contextual demands, rather than stable and fixed. Construal operations are the source of all readings, conventional as well as *ad hoc* contextual readings. A leading idea of this approach is that lexical items *evoke* meanings rather than *have* meanings; lexical meanings emerge in actual language use in human communication (Cruse 2002; Paradis 2003, 2005, 2008, 2016; Paradis and Willners 2011). The notion *usage-based* is fundamental to all cognitively oriented approaches to meaning. It is also central to our treatment of antonymic adjectives and the nominal meanings that they modify, both as a basic theoretical assumption about language and as a methodological requirement.

Our model of lexical meaning makes a fundamental distinction between *Ontologies* on the one hand and *Construals* on the other. Ontologies are conceptual structures or "pre-meanings". They serve as the raw material for the development of meanings in actual communication. These pre-meaning structures are lower-level conceptual material that contributes to the final creation of discourse meaning in language use. Ontologies are of two main types: contentful structures and configurational structures. These two types of structure are not as discrete as it may sound; rather they are viewed as being on a continuum from primarily contentful pre-meanings to primarily configurational pre-meanings. The contentful and the configurational structures combine in meaning creation and the final instantiation of some part of the entire meaning potential in its domain on the occasion of use. Construals are cognitive processes that operate on the ontological structures when we use language to create meaning in communication with other people. They are imposed on the concepts by speakers and addressees at the time of use and thereby establish the fully fledged discursive reading (Langacker 1987, 1999; Paradis 2004, 2005, 2008; Panther and Thornburg 2012).

Table 1 provides a break-down of the two types of ontological pre-meaning structures and the various types of construals that might operate on the conceptual structures in the formation of meaning in language use. Contentful structures involve 'meaning proper', i.e., meaning structures pertaining to CONCRETE OBJECTS, EVENTS, PROCESSES, STATES, and ABSTRACT PHENOMENA. Configurations, on the other hand, are schematic templates that combine with the contentful structures when meanings are profiled in discourse. The list of different configurations is not exhaustive but represents a sample of central types of which BOUNDEDNESS and SCALE are of key importance for the coding schema of this study.

The leftmost column of Table 1 gives the three most general contentful pre-meaning structures, which in turn comprise more fine-grained structures, including pre-meaning structures that relate to categories such as BABY, CAR, and STONE; EVENT structures, such as RUN, DIE, and UGLY, and abstract structures such as IDEA, PROBLEM, and STRUCTURE (for more detail, see Paradis 2005). The

Table 1: Ontologies and cognitive processes in meaning construction, adapted from Paradis (2005).

Ontologies (conceptual structures)		Construals (processes)
Contentful pre-meaning structures	Configurational pre-meaning structures	*Gestalt*: e.g., structural schematization, profiling
(i) CONCRETE SPATIAL MATTERS	BOUNDEDNESS	*Salience*: e.g., metonymization, generalization, zone activation
(ii) TEMPORAL EVENTS, PROCESSES AND STATES	SCALE DEGREE	*Comparison*: e.g., metaphorization, categorization
(iii) ABSTRACT PHENOMENA	PART-WHOLE THING-RELATION POINT FREQUENCY FOCUS PATH ORDER	*Perspective*: e.g., foregrounding/ backgrounding, subjectification

contentful dimensions evoked for words such as *good, wide*, and *small* are STATES, namely MERIT, WIDTH, and SIZE, respectively. Their meanings are interpreted against a meaning configuration, i.e., a simple schematic UNBOUNDED SCALE structure that hosts the properties GOOD, WIDE, and SMALL, which might be expressed by *good, wide*, and *small* or expressions that evoke similar meanings such as *respectable, broad* or *slight*. Dimensions and properties are of particular importance for antonymic adjectival meanings. SCALE is the structuring configuration of the above lexical semantic couplings and the properties GOOD, WIDE, and SMALL are simple types of content concepts. *Good, wide*, and *small* express properties at one end of the scale of which *bad, narrow* and *large* are words that evoke the opposite pole of the UNBOUNDED SCALE. *Dead–alive, closed–open* and *empty–full* are primarily associated with a BOUNDED configuration which may or may not combine with a SCALE structure in discourse. This short description of the model provides the necessary background to the study and to the description of the analysis in Section 4.

4 Aims, data and method

This section states the goals of the study and provides a description of and motivation for the selection of the test items of the study. It also offers a description of the semantic and constructional parameters used in this investigation that relate to LOC and describes how the test items were extracted from the BNC and the

coding principles. In Section 5, we describe our coding system in more detail, using the antonymic pair *thin* and *thick* to exemplify and provide explanations of the procedure. It should be noted again that the main thrust of this study does not concern the data set as such but the pairwise patterning of the individual adjectives in relation to one another – a within-pair approach.

4.1 Aims

The specific aims of this study are:

- To chart a random sample of the usage patterns of 42 individually occurring antonymic adjectives in English;
- To measure to what extent they are used in the same semantic contexts as their antonymic partners also when they are not used to express binary opposition *per se*;
- To assess previous theoretical approaches to lexical semantic relations in language – notably meaning as relations, as in Structuralism, including both the paradigmatic (the substitutability hypothesis) and the syntagmatic (the co-occurrence hypothesis) approaches, and meanings as substantial structures as within the Cognitive Linguistics framework.

4.2 The test items

The choice of adjectives for this study is based on a large number of extensive studies of antonym use in text as well results of studies of these and other words in experimental settings carried out during the past decade (Jones et al. 2012; van de Weijer et al. 2012, van de Weijer et al. 2014). They have been shown to be strongly opposable and all of them co-occur with a *p-value* of 0.0001 or lower in the BNC (the method of identification is described in Willners 2001: 83; Paradis et al. 2009).

The conceptual dimensions along which the pairings evoke opposite properties appear in small capital letters in Table 2, followed by the antonymic word pairs in italics. With the exception of *slow–fast*, they all evoke stative properties, some of which can be calibrated using some kind of objective instrument, e.g., *long*, *thin* and *large*, while others are clearly more subjectively evaluative, e.g., *bad*, *good*, *ugly* and *beautiful*.

The data set consists of a good 500 randomly selected occurrences of each of the above adjectives in their contexts in the BNC (some 21,000 occurrences in total). The UNIX command *grep* was used to retrieve the sentences containing the target words tagged as adjectives in the BNC, and the nominal heads of the

Table 2: The 21 antonym pairs: their meaning dimensions and lexical forms.

DIMENSIONS	antonym pairs		DIMENSIONS	antonyms pairs	
AGE	*young*	*old*	SIZE	*little*	*big*
APERTURE	*closed*	*open*	SPEED	*slow*	*fast*
BEAUTY	*ugly*	*beautiful*	STRENGTH	*weak*	*strong*
EXISTENCE	*dead*	*alive*	TEMPERATURE	*cold*	*hot*
FULLNESS	*empty*	*full*	TEMPERATURE	*cool*	*warm*
HARDNESS	*soft*	*hard*	TEXTURE	*smooth*	*rough*
HEIGHT	*low*	*high*	THICKNESS	*thin*	*thick*
LENGTH	*short*	*long*	WEALTH	*poor*	*rich*
LUMINOSITY	*light*	*dark*	WEIGHT	*light*	*heavy*
MERIT	*bad*	*good*	WIDTH	*narrow*	*wide*
SIZE	*small*	*large*			

adjectives were then identified using a head finder script. The sentence in the written part of the corpus data and the corresponding chunk for the spoken occurrences for each of the adjectives were imported into FileMaker Pro and the adjectives were then manually coded with respect to the four parameters described below. We discriminate between different senses, such as *light* ('not dark') and *light* ('not heavy') as in Table 2, but not metaphorical uses, say *hard* ('not easy'), since we operationalize sense boundaries in terms of the adjectival properties in relation to the meaning dimension they evoke irrespective of whether the instantiation is concrete or abstract.

4.3 The parameters

The four different parameters, which are the analytical elements of the study of the 42 adjectives, are described in this section. The parameters are meant to reveal the patterns of these particular test items in every instance of use in the corpus data. We are not making claims about other English adjectives such as *financial, pictorial, English, only, first, mere*, which are not known to be strongly antonymic, but which of course can express opposition in antonym construals. The parameters under investigation are *gradability*, *constructional use* (attributive or predicative), *nominal meaning*, and *basic or figurative use* (metaphorical and metonymical). The parameters are selected to account for the interpretations of the adjectives in their individual contexts. The level of abstraction and the granularity of the coding schema are high because we did not want to put the cart before the horse and force the data into a pre-determined template rather than letting the data speak for themselves.

4.3.1 Gradability

First, the adjectives were categorized with respect to gradability, i.e., as *non-gradable*, *scalar*, or *non-scalar* (Paradis 2001, 2008). Scalar adjectival form-meaning pairings are fully gradable and combine felicitously with such degree modifiers as *very* and *fairly*. Non-scalar adjectives are complementaries. They divide a conceptual domain into two distinct parts, i.e., a living creature is either dead or alive. Such adjectival form-meaning pairings combine felicitously with totality modifiers such as *absolutely*, *totally* and *perfectly*. Finally, non-gradables have a classifying function and, for this function, they are not compatible with degree modifiers. The following three examples illustrate the differences between the three categories:

(5) *That kid is going to be very* big. (scalar)

(6) *The man had been* dead *for three days*. (non-scalar)

(7) *The debate will take place behind* closed *doors*. (non-gradable)

Big in (5) evokes the meaning 'much of SIZE' for CHILD. As indicated by the term scalar, such meanings are construed along a scale – an UNBOUNDED SCALE, which is relative to the reference point of CHILD in a given context. Such meanings can be modified by scalar degree modifiers, e.g., *very, fairly, extremely. Dead* in (6) is non-scalar and configured as BOUNDED. It expresses a meaning that is associated with a boundary across the dimension of EXISTENCE. Such a meaning configuration divides the contentful meaning dimension in two distinct parts, e.g., *dead–alive*. BOUNDED meanings in languages may take totality modifiers, i.e., modifiers that highlight the boundary such as *totally, completely* or approximators such as *almost, nearly*. The use of *closed* in (7) is non-gradable, which means that grading is not applicable at all. BOUNDED and SCALE are the kind of configurations listed in Table 1 in the column for Configurational pre-meaning structures. They are central to the semantics of this type of adjectival meanings. The reader should be reminded again that configurational structures are evoked in context to express certain discursive meanings. They are not part of the structure of the word, since no set word meanings are assumed.[3]

3 The flexibility of configurational use has been an object of study both in textual and experimental studies (Paradis 2008; Paradis and Willners 2006, 2013).

4.3.2 Constructional use

Secondly, the adjectives were coded according to their use as either attributive or predicative. This parameter is taken to be an important component of meaning and regarded as a CONSTRUCTION in the technical sense, i.e., as two different form-meaning pairings (Goldberg 2006). To simplify, we may say that the main function of attributive adjectives is to express properties that either classify/define or describe an entity where the adjectival property is less newsworthy than a predicative adjective, where the newsworthiness is highlighted through the predication. Consider Examples (8) and (9).

(8) *Tina is wearing her* new hat *today*.

(9) *Tina's* hat *is* new.

In (8), Tina is wearing a hat and the hat that she is wearing is new. The example in (9), on the other hand, describes the hat, rather than the fact that Tina is wearing her new hat.

4.3.3 The semantics of the noun

Thirdly, the content structure of the nouns modified by the adjectives under investigation were analyzed and tagged according to the three most general meaning types of LOC's noun ontology. As shown in Table 3, the top meaning types are referred to as 1st order pre-meanings (concrete phenomena), 2nd order meanings (events, processes and states) and finally 3rd order meanings, i.e., abstract phenomena. In Table 3, we give some examples of such discursive meaning types of each level. 1st order meanings primarily evoke meanings of spatial matters, comprising word meanings pertaining to the areas of experience given in the leftmost

Table 3: Examples of lexical items that may be used for the three different meaning types, when they are used in discourse.

1st order meanings	2nd order meanings	3rd order meanings
animal, people, plant, artefact, natural object, location, substance, sound, vision	*Event*: destruction, death, victory *Activity/process*: jog, bake, discussion *State*: happiness, sadness, pain, smell, taste	fact, system, thing, point, linguistics, question, knowledge, science, context, area, degree amount, year, day, autumn

column. Their main domain of instantiation is SPACE. Next, 2nd order meanings are profiled against the time domain and involve meanings relating to events, activities and states that 'happen' or 'take place'. Their primary domain of instantiation is TIME. Finally 3rd order meanings are meanings that are abstract constructs or ideas that may be referred to as Mental Objects or Shells, whose primary domains of instantiation are neither SPACE nor TIME.[4]

As shown in Table 3, our tagging is a semantic tagging of the readings of the nominals for each one of the instances that make up the data set for the individual antonymic words. First-order meanings in discourse are no longer pre-meanings as in the model in Table 1, but fully-fledged discursive meanings in use.

(10) *The* big animal *disappeared behind the trees*.

(11) *Yes, the* going *will be* slow *tonight but erm not as slow as it has been in the past erm so it should be good*.

(12) *This* old system *is outmoded*.

Animal in (10) is a 1st order meaning, profiling ANIMAL as instantiated in concrete space. Example (11) profiles *going* as 2nd order meaning, i.e., it has its primary instantiation in time, and (12) profiles an abstraction which serves as a shell for some content.

4.3.4 Basic, metaphorical and metonymical uses

Finally, as has already been touched upon, the adjective-noun combinations were coded according to whether their uses were one of metaphorizations and metonymizations or not (which we refer to as basic for lack of a better term) in the analysis. Combinations of adjectives and nouns were coded as basic if they refer to concrete interpretations of nominals. They were tagged as metaphors when the adjectives induce a non-concrete interpretation onto the nominal or when the adjective induces a reification of a 2nd and 3rd order meaning. For instance, the integrated meaning of *thin qualifications* evokes the meaning of 'basic and insufficient' qualifications in mental space rather than something that is calibratable in three-dimensional space and so does the use of *hard* in (13), while (14) and (15) are metaphorical uses.

4 These terms were introduced by Lyons (1977).

(13) *Erosion of* hard rocks *is usually very different*. (basic)

(14) *Not all beautiful* women *are as* hard *as you make out*! (metaphor)

(15) *It was a tribute to the* hard work *and team effort put in by staff and children from the top four classes*. (metaphor/reification)

(16) *More financial support would help improve her chances against the* big names. (metonymy)

The nominals were coded as metonomies when the use of the nominal either deviated from its conventional use, i.e., metonymization proper, as in (16) where *big names* profiles PEOPLE and not NAME, or in cases of facetization of lexical meanings such as in *a thin report*, where 'thin' induces one of the possible facets of report, i.e., as TOME or CONTENT. An extended discussion about the treatment of such meanings is included in the next section. More subtle uses *within* senses are beyond the scope of this investigation. Meanings, such as 'teacher', 'writer' and 'priest', e.g., *he's a good teacher*, were classified as basic, since the sense of what the person is *good* or *bad* at is very central to the nominal meaning, which is a 1st order profiling (a more detailed description is given in Sections 5 and for the argumentation the reader is referred to Paradis 2004).

4.4 Practical procedure

The methodological procedure used in the analysis of the data proceeds from the lexical items in each case to their actual discursive interpretations in context, i.e., from linguistic items to their contextual readings. For instance, if the actual reading of say *short report* refers to the paper copy, it was analyzed as a concrete object since its basic domain of instantiation is SPACE/CONCRETE OBJECT, and if it refers to the content it was coded in its domain of instantiation which is neither SPACE nor TIME, but ABSTRACT/MENTAL SPACE. Although LOC is a semantic model for meaning making in general, it is primarily used as a practical analytical tool for the identification of 'real' discursive meanings in text in this study. Crucially, this method then also involves a close analysis of the combining nominals and the meanings they express in each instance. The method of identifying discursive meanings of the antonymic word pairs in their contexts serves to make it possible to make generalizations across the interpretations of the lexical items rather than focusing on the lexical items as such without taking their meanings into account, which is the case in corpus-driven analyses of antonym use.

The nominal meanings modified by the adjectival dataset were coded on the basis of what the meanings they profile in each and every particular context, which means that the analyst always also had to examine the broader context. For instance, the word *organization* may be used to refer to the abstract idea in one context, in which case it would be coded as a 3rd order meaning; (no such examples of the use of *organization* were found in the current data). It may profile the group of people who form the organization in another context (1st order meaning), as in (17), or the actual activity of organization in a yet another context, in which case it would be tagged as a 2nd order meaning, as in (18).

(17) *But achieving policy change is never an easy process, particularly if one is a comparatively junior participant in a* large organization.

(18) *Other crowned heads enjoyed less* smooth organization *on their travels than did Queen Victoria*.

The absolute numbers of the adjectives that fulfil the requirements of being included in this study vary. For various reasons, quite a few occurrences from the data set had to be excluded. Many of them were from the spoken part of the BNC. In the majority of cases, exclusions were due to the fact that there was not enough context for any type of analysis. Spoken language is inherently problematic since speakers change their minds in the middle of the utterance, are interrupted, or for some reason or another simply stop short. Furthermore, some of the target words were incorrectly tagged as adjectives in the BNC and therefore had to be removed from the study. For instance, in some contexts, *fast* and *high* were erroneously coded as adjectives by the BNC tagger, such as in *the unarmed plane flew very fast and very high*, where *fast* and *high* are adverbs. Also, some occurrences of *fast* were not related to SPEED, but to other uses such as 'firmly fixed', as in *the horse was fast in the mud*. In other words, we excluded uses that are not associated to the dimensions in Table 2. Another example of such a use is the response marker *Good!*, i.e., meaning 'alright' or 'okay'. As Table 2 also shows, the adjective *light* occurs twice in the study, both in the sense of 'not heavy' along the meaning dimension of weight, and in the sense of 'not dark' along the dimension of heaviness. Needless to say, we could not a priori distinguish these two meanings; this was done during the coding of the data. As it turned out, there were more instances of *light* meaning 'not heavy'. This made the number of the instances of the two senses used in the analysis rather unbalanced. We therefore found it necessary to code another couple of hundred random instances to achieve the right balance so that the relevant calculations could be

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PMU:(idp) 17/11/2014 28 November 2014 1:49 PM

made. In the analysis, we refer to the two instances of light as *light* (*heavy*) and *light* (*dark*).

Finally, in order to ensure robust analyses, 10% of the data was double coded for four of the test items, *bad, good, thin* and *thick*. *Kappa* analyses were performed on the results showing that the inter-coder reliability was satisfactory (92% agreement, *kappa* = 0.902).

5 Case study of *thick* and *thin*

This section introduces a case study of the usage patterns of *thick* and *thin* with the purpose of fleshing out our method of analysis and coding through concrete exemplifications of our procedure. The section discusses the types of readings of the members of the pairs that we coded for and it gives an in-depth description of what subtypes of 1st order meanings the antonymic pairs modify and to what extent they are involved in what we have considered to be metaphorizations and metonymizations. The main purpose of this section is not to put the spotlights on *thin* and *thick* per se, but to use the pair to provide a concrete example of how the data were analyzed in order to facilitate the understanding of the results of the entire study for the reader.

Table 4 provides examples of a number of subcategories of 1st order meanings, which is the type of meaning that is most important for how *thin* and *thick* are used. Because there are considerably fewer uses of *thin* and *thick* with 2nd and 3rd order meanings, they are only discussed in the text. The quantitative patterns are also described in the subsequent sections together with all the other pairs. The majority of the 1st order nouns that combine with *thin* and *thick* fall under the subcategory of Artefacts, where their main role is to modify the calibratable dimension of volume or width, and the nominal meaning structures refer to artefacts of various different kinds of material, such as metal, plastic, paper, and textile.

The artefacts that combine with *thin* in these data, as shown in Table 4 do not only comprise entities that encompass concrete meaning facets but also qualitative aspects of concrete entities, such as *a thin report*, where *thin* modifies the CONTENT facet (not the TOME facet). The meanings are construed as metaphorizations in the sense that the property expressed by *thin* in the physical world is transferred into the mental world, and the interpretations are that the documents are lacking in substance or significance. It is not the documents as such that are *thin*, but their content. In the database, combinations of this kind are coded as 1st order meanings and as metaphorizations.

Table 4: Distribution of uses of *thin* and *thick* across 1st order meanings.

Subcategory	*thin*	*thick*
Artefacts	*thin cables, thin edges, thin cotton, thin anorak, thin wall, thin cardboard, thin gold chain, thin silver coating*	*thick glasses, thick make-up, thick walls, thick coat, thick book, thick layer of glass, thick material, thick cover, thick towels*
People	*thin woman, thin Englishman, thin face, thin lips, thin arm, thin nose, thin hand, thin legs*; *thin sheet of bone, thin covering of skin, thin veins, thin rivulet of blood*	*he thinks I'm thick, these councilors are so thick, stop being so thick*; *thick lips, thick hands, thick body, thick arms, thick lashes, thick eyebrows, thick hair*
Natural objects	*thin roots, thin cane, thin hedgerows*; *thin beech spinney*	*thick piece of deadwood, thick mamillated shells, thick rock sequences, thick snow*; *thick bush, thick grass of the meadow, thick undergrowth, thick cluster of trees*
Non-solids	*thin light, thin mist, thin air*	*thick fog, thick ice-laden cloud, thick mud*
Food	*thin sauce, thin beer, thin wine*; *thin rashers, thin bread, thin slices of coconut, thin strips of white icing*	*thick porridge, thick jam, thick soup, thick Cornish cream; thick ham-sandwich, thick slices from a loaf of bread, thick coating of milk chocolate*
Sound	*thin scratchy voice, his voice uncommonly thin, a thin gentle slithering sound*	*her voice thick with emotion, his voice thick with desire, her voice was thick and husky, what a snore he had strong, long thick and hard.*

The second-largest group within the 1st order combinations is *thin* and *thick* combined with meanings related to People, including body and body parts. In the majority of occurrences of this type, *thin* is expressing 'little flesh', and in the vast majority of these combinations, *thin* modifies people holistically, i.e., their constitution rather than the functions they perform. In the cases, where *thick* refers to people holistically, the construal is one of metaphor, where *thick* means 'stupid'. Such combinations are coded as 1st order meanings and metaphorizations, because the profiled entity is the person. *Thick* modifies a mental property of the person through metaphorization. In addition, both *thin* and *thick* modify the calibratable dimension of volume and width of body parts. In combination with body parts, such as arms and legs, *thin* and *thick* are used in a similar way, but there are fewer occurrences where the role of *thick* has to do with 'excess flesh' compared to its opposite *thin* used to refer to 'little flesh'. In the majority of

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PMU:(idp) 17/11/2014 28 November 2014 1:49 PM

occurrences where *thick* combines with body-part meanings, it is used to modify density of parts, namely different kinds of hair.

Another fairly large group is the combination of *thin* and *thick* with Natural Objects or Phenomena, such as for example rocks, grass, shells, rime, sand, lithosphere, a pattern that is far more common for *thick* than for *thin*. This might be explained by the fact that *thick* is often used in an impartial way (Croft and Cruse 2004: 176), as in *How thick is the tree?*. The most common role of *thin* and *thick* in combination with Natural Objects, is to modify the calibratable dimension of volume or width of the objects. All but one of the uses profile the constitution of concrete entities such *thin roots*, while *thin snow* refers metonymically to the LAYER. *Thin* and *thick* also refer to sparseness/density of parts and groupings of plants and trees.

Furthermore, there are a few minor subcategories including among others Non-solids, Food and Sound. As shown in Table 4, Non-solids encompass references to entities such as liquids, vapors and light. *Thin air* is used metaphorically, in expressions such as *vanish into thin air, emerge from thin air, he had materialized out of thin air, faith does not feed on thin air but on facts*. In the context of Food the use of *thin* and *thick* fall into two distinct categories, one modifying consistency/or taste of liquid and the other modifying volume or width. In some cases where *thin* modifies consistency, it is used metonymically, e.g., in *thin wine* and *thin beer*, in which case *thin* does not refer to consistency as such, but to lack of smell and taste (Paradis and Eeg-Olofsson 2013). In the data set, *thin* and *thick* are also used to modify sound, mostly, but not only, the sound of voices. *Thin* denotes sound that is lacking in resonance or volume, while *thick* in combination with 'voice' seems to be connected with emotional states.

Only very rarely do *thin* and *thick* combine with 2nd order meanings. The majority of those uses are metaphorical. For instance, in 'the *thin smile* turned into a grin', the important thing in the context it occurs in is the actual concrete size of the smile. In the metaphorical uses in combination with 2nd order meanings, the meaning is one of reification of an EVENT or a STATE into THING, a kind of reversed metaphor. It is coded as metaphor in our data, as in 'She did find in it some *thin satisfaction*', 'there are times when *love* goes very *thin*', and 'there was a *thin cold smile* on her face'. *Thin* in combination with STATES modifies the property expressed by the nominals *thin satisfaction, thin love* and *thin smile,* in a negative direction of lacking in spirit or sincerity or lacking in significance. Other examples of this phenomenon are *thin trade, thin distribution, thin attendance*, all of which involve a reification of the events, creating a summary scanned THING and the role of *thin* is to express sparseness in much the same way as it does in combinations such as *thin beech spinney*. All the uses of *thick* are metaphorical, half of which are about accent, as in *thick West Midlands drawl, thick Liverpool accent,*

a thick English accent. Finally, the number of occurrences where *thin* and *thick* modify 3rd order entities is also small. There is in fact only one single case with *thick*: *thick description*, and a dozen occurrences with *thin*: *thin financial margins, chances look thin, thin news coverage, thin theological content, thin historical record, some years were thin, women were thin on the ground*.[5]

6 Results

This section presents the results of the study of all 42 adjectives. We focus both on the patterns of usage of the four parameters that we investigated one at a time, and on their interactions. Furthermore, we specifically examine the symmetry of the 21 pairs, i.e., we evaluate whether the pattern of usage of one member of an antonymic pair is similar to that of the other member. The pattern of the whole data set is not the focus of attention in this study, but rather a by-product of the within-pair design based on different dimensions. As a starting point, we look at the four parameters individually (Sections 6.1–6.4). We then continue with the overall picture (Section 6.5). All the frequencies for the individual parameters are collated and presented in Table 5.

6.1 Gradability

The majority of the adjectives in our data set are most often used as gradables. That is, they are construed on the basis of either a scalar (unbounded) or a non-scalar (bounded) structure. They are used as descriptors of a property of the nominal meanings they modify. As is clear from the distributions shown in Table 5, adjective gradability is most often of the scalar type. However, six adjectives are predominantly construed with a non-scalar configuration. This group consists of the three antonymic pairs: *closed–open*, *dead–alive* and *full–empty*. Among the other adjectives, non-scalar uses are rare. Some of the adjectives are used as non-gradables, primarily *little, young, old, fast, light* and *closed*. These non-gradable uses perform a subclassifying or identifying function, rather than a descriptive function, as in *big bang, closed shop, hard disk, little finger, old school, smooth muscle, soft drinks, short story, long run, hot water, open air, young lady* or *fast food*. For instance, *fast food* is not used to describe the food that has a particular

5 The reader is reminded that the coding of the instances always takes the whole context into account, which means that out of context some of the occurrences may seem categorically ambiguous.

Table 5: Frequency distribution of the four parameters across the set of adjectives.

	Noun ontology			Adjective ontology			Figurativity			Adjective position		N
	1st	2nd	3rd	Non-gradable	Non-scalar	Scalar	Basic	Metaphor	Metonym	Attributive	Predicative	
small	359	34	105	7	0	491	460	19	19	439	59	**498**
large	342	16	143	1	0	500	485	8	8	452	49	**501**
little	327	56	114	250	0	247	323	168	6	496	1	**497**
big	317	74	109	9	0	491	431	50	19	457	43	**500**
weak	257	85	156	3	8	487	216	281	1	268	230	**498**
strong	208	73	220	0	1	500	124	377	0	358	143	**501**
narrow	345	12	120	2	0	475	344	131	2	414	63	**477**
wide	246	33	222	1	6	494	194	305	2	406	95	**501**
thin	441	15	20	6	1	469	407	61	8	402	74	**476**
thick	457	5	2	0	0	464	411	49	4	325	139	**464**
low	160	100	240	11	1	488	100	391	9	389	111	**500**
high	138	123	216	36	4	437	106	366	5	393	84	**477**
short	111	79	218	42	1	365	160	242	6	348	60	**408**
long	195	117	260	48	19	505	249	319	4	502	70	**572**
cold	336	40	61	45	1	391	325	100	12	254	183	**437**
hot	372	41	57	65	0	405	347	73	50	303	167	**470**
soft	395	47	52	62	15	417	261	230	3	383	111	**494**
hard	176	123	184	56	3	424	146	337	0	293	190	**483**
young	494	0	9	355	1	147	490	8	5	442	61	**503**
old	278	11	80	138	3	228	350	16	3	311	58	**369**
smooth	324	110	29	35	0	428	259	201	3	338	125	**463**
rough	253	64	108	4	0	421	169	255	1	349	76	**425**
slow	141	268	61	23	2	445	405	35	30	282	188	**470**
fast	222	113	40	109	3	263	289	26	60	316	59	**375**

Table 5 (cont.)

	Noun ontology			Adjective ontology			Figurativity			Adjective position		N
	1st	2nd	3rd	Non-gradable	Non-scalar	Scalar	Basic	Metaphor	Metonym	Attributive	Predicative	
bad	128	114	260	0	2	500	468	15	19	331	171	**502**
good	149	110	174	4	1	428	422	4	7	317	116	**433**
ugly	329	61	72	1	0	461	296	166	0	300	162	**462**
beautiful	419	28	47	0	0	494	439	50	5	348	146	**494**
poor	156	88	106	0	1	349	89	240	21	278	72	**350**
rich	344	12	91	1	0	446	301	135	11	301	146	**447**
dark	452	15	61	8	0	520	417	94	17	447	81	**528**
light (not dark)	232	8	17	2	3	252	245	8	4	181	76	**257**
closed	290	26	152	123	321	24	173	293	2	393	75	**468**
open	246	40	124	16	320	74	151	254	5	244	166	**410**
empty	436	10	49	1	492	2	406	87	2	301	194	**495**
full	93	97	171	3	345	13	314	35	12	342	19	**361**
dead	367	8	35	1	403	6	325	80	5	166	244	**410**
alive	394	8	78	1	433	46	321	156	3	0	480	**480**
heavy	301	85	84	65	1	404	334	133	3	416	54	**470**
light	494	187	73	111	9	634	322	329	103	607	147	**754**
warm	368	61	64	12	0	481	305	131	57	303	190	**493**
cool	320	60	81	24	0	437	193	245	23	270	191	**461**

consistency as such, but to refer to food that is ready-made or semi-manufactured that you typically consume fast as well. *Little finger* refers to a subcategory of the fingers of the hand together with its co-hyponyms: The thumb, the index finger, the middle finger and the ring finger.

From the point of view of pairwise patterning of the adjectives, most of them feature the same proportions of gradability use. However, there are also exceptions. The most striking one is *little* in this respect. *Little* does not only deviate from *big* but also from the other SIZE adjectives (*small* and *large*). There are also quite large use discrepancies between *young–old, slow–fast* and *closed–open*. The main reason for the discrepancies in all these cases is due to the fact that *young, fast* and *closed* are more often used as non-gradables than their antonymic counterparts are. Almost all non-gradable uses of *young* are to address people, e.g., *young boy!, young girl!, young man!, young woman!*, while *old* is used in a variety of contexts, both for addressing people and for the classification of entities, e.g., *old man!* and *old age*. In the case of *fast,* there are only few combinations. They are *fast food, fast bowler/bowling*. As for the rest of the pairings, there are just minor differences with respect to gradability usage.

6.2 Constructional use

The results of the analysis clearly show that the adjectives pattern in a symmetrical way, e.g., *small–large, narrow–wide, low–high, short–long, young–old,* and *ugly–beautiful*. In the case of the expressions of SIZE, it deserves to be pointed out that *big* is used in a similar way as *small–large*, while *little* differs from the other SIZE adjectives; *little* is not used predicatively except in one case – in the expression *when I was little*. Also, as shown in Table 5, it is clear that there is a preference for all the adjectives in the data set to be used attributively as premodifiers. Only two adjectives (i.e., *dead* and *alive*) are used more often in predicative position. We interpret this as an indication that their usage preference is as a newsworthy element of situations. The preference for the attributive use varies across the remaining adjectives. For most of them, the preference for attributive use is fairly strong, but there are a number of adjectives with less pronounced preferences.

6.3 The semantics of the noun

This section reports on the use of the antonymic pairs in combination with different types of nominal meanings at the most general level, i.e., what we refer to as

combinations of adjectives and nouns along our three different types of nominal meanings: (i) 1st order (meanings primarily instantiated in concrete space); (II) 2nd order (meanings with primarily temporal instantiation, i.e., processes and states); (iii) 3rd order (abstract matters). This parameter is concerned with the various combinatorial preferences of adjectival uses and nominal meanings and like the other parameters, it is used to examine whether the usage of the members of the antonymic pairings is symmetrical or not. The figures in Table 5 suggest that noun ontology has a more diversified distribution compared with the other three parameters. Most adjectives combine with all three nominal categories, and there are few empty cells. Table 5 does not show a completely clear pattern, but the following trends emerge. Most adjectives in the data set combine most frequently with 1st order nominal meanings. The exceptions to this are *low–high*, *short–long*, *good–bad*, *hard* and *full*. These adjectives frequently combine with all three types of nominal categories. Interestingly, the first six of these eight adjectives are antonym pairs, while *hard* and *full* differ from their antonyms (*soft* and *empty*) with respect to the nominal meanings they modify.

6.4 Basic, metaphorical and metonymical uses

In this section, we take a closer look at the patterns of basic, metaphorical and metonymical uses of the antonymic pairs. It is clear from Table 5 that, across the board, metonymic use is rare and that most adjectives are most often used in their basic (non-figurative) sense. The exceptions to this are *weak, strong*, *wide*, *low, high*, *short, long*, *closed*, *open*, *hard*, *rough*, *poor*, and *cool*. Again, some of those are antonymic pairs (*weak–strong*, *low–high*, *short–long*, *closed–open*), while some others do not share this pattern with the other members of the pairings. From the point of view of their usage patterns across the antonymic pairs, there is a correlation between the members of the pairs in their basic/figurative usage in the sense that they tend to be used metaphorically to the same extent. This suggests that figurativity is a characteristic of the contentful dimension expressed by the antonymic adjectives rather than a characteristic of the individual opposite properties of that dimension. Pairs that are rarely used metaphorically are *small–large*, *good–bad*, *old–young*. At the other extreme we find *low–high*, *weak–strong*, *soft–hard*, *short–long* and *open–closed*, which are more often used figuratively. Metonymical use is infrequent across the board, but in cases of metonymization, the use is symmetrical across the antonymic pairs: *fast–slow*, *cold–hot*, *warm–cool* are used in metonymical contexts, while *weak–strong*, *narrow–wide* and *soft–hard* are not. One word pair stands out in being asymmetrical here, namely *light–heavy*.

6.5 The overall picture

We performed a correspondence analysis based on the figures given in Table 5. The result is shown in Figure 1. Correspondence analysis is an exploratory analysis that assists in the interpretation of contingency tables (Greenacre 2007) determining how much the rows and the columns of the table deviate from the marginal totals (the average patterns). These deviations are often represented graphically as distances between points in two-dimensional space, as shown in Figures 1 and 4 below. The plots are called biplots. They should be understood as follows. Rows or columns that deviate relatively little from the overall pattern are close to the origin. Rows or columns that deviate more are located at a greater distance from the origin.

We see the following patterns in the map in Figure 1. The horizontal axis of the plot represents adjective scalarity with the non-scalar adjectives to the left of the vertical axis and the scalar adjectives to the right. There are six adjectives that are used as non-scalars: *dead*, *alive*, *empty*, *full*, *closed* and *open*. Within this group we see relatively little vertical spreading, that is, all six adjectives stay close to the horizontal axis. The six non-scalar adjectives are easily recognized in Table 5 too due to their high frequencies as non-scalars.

The adjectives to the right of the vertical axis show considerably more vertical spreading. All the way to the top, three adjectives are represented that are used exceptionally often as non-gradables. These adjectives are *young*, *old* and *little*. Furthermore, the vertical dimension also seems to correlate with two of the other parameters that we investigated, namely metaphor and noun ontology. Adjectives that are located towards the lower end of the vertical axis (below the horizontal scale, e.g., *low*, *strong* and *high*) are used more often than average with 3rd order meanings and in metaphorical use, whereas adjectives towards the upper end of the vertical axis (e.g., *fast*, *thick* and *hot*) tend to be used more often non-metaphorically and with 1st order meanings. Finally, constructional use (attributive or predicative) does not seem to contribute much to the variation that we see among the adjectives.

In order to make it possible to see the general picture of the usage pattern of the 42 adjectives in the data set, we combined the frequencies in a new table that collates the codings of the parameters showing their mutual dependencies. Since the full table (Table 5) contains all combinations of all levels, it has many cells that contain a zero We made two compromises: First, we merged the adjective-ontology categories *scalar* and *non-scalar* into one category *gradable*. Second, we collapsed the categories *metaphor* and *metonym* into a single category that we call *figurative*, primarily because metonymizations are comparatively rare. Gradable use, then, contrasts with non-gradable use and basic use with figurative. The result, after collapsing these categories, is shown in Table 6.

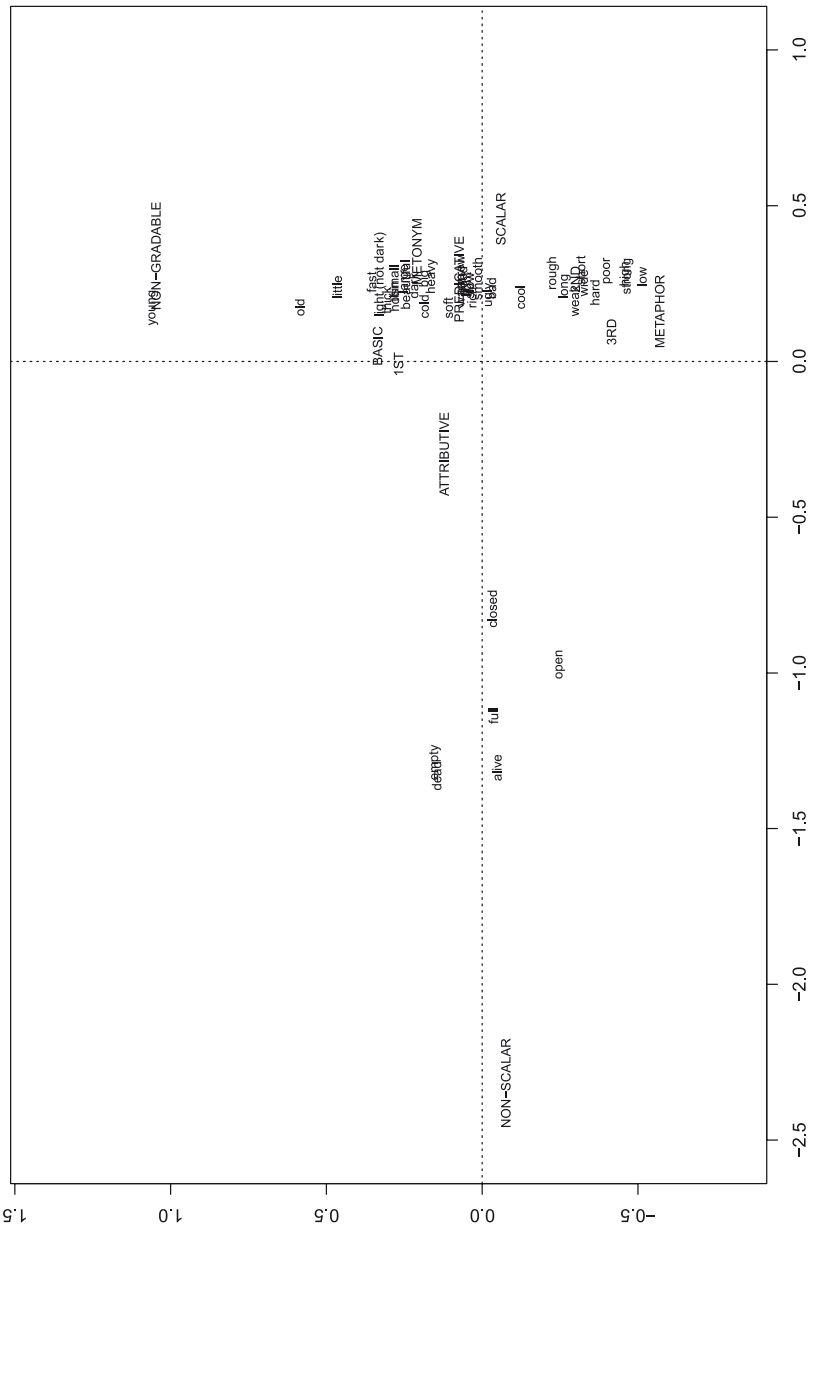

Fig. 1: Correspondence analysis biplot based on the data presented in Table 5.

Table 6: Frequency distribution of the four parameters combined across the set of adjectives (A = Attribution, P = Predication)

	Basic												Figurative											
	1st				2nd				3rd				1st				2nd				3rd			
	Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P
small	297	37	7	0	27	2	0	0	73	17	0	0	17	1	0	0	4	1	0	0	14	1	0	0
large	297	32	1	0	14	2	0	0	128	11	0	0	10	2	0	0	0	0	0	0	2	2	0	0
little	164	1	104	0	7	0	14	0	23	0	10	0	8	0	50	0	8	0	27	0	36	0	45	0
big	239	32	2	0	60	1	5	0	87	5	0	0	40	3	1	0	8	0	0	0	14	2	1	0
weak	55	83	0	0	50	16	0	0	6	5	1	0	62	56	1	0	15	4	0	0	77	66	1	0
strong	66	46	0	0	9	2	0	0	0	1	0	0	62	34	0	0	48	14	0	0	173	46	0	0
narrow	277	39	0	0	2	2	0	0	22	2	0	0	23	4	2	0	5	3	0	0	83	13	0	0
wide	105	76	1	0	5	1	0	0	6	0	0	0	59	5	0	0	25	2	0	0	205	11	0	0
thin	343	59	3	0	2	0	0	0	0	0	0	0	28	5	3	0	9	4	0	0	14	6	0	0
thick	300	110	0	0	1	0	0	0	0	0	0	0	18	29	0	0	4	0	0	0	2	0	0	0
low	61	16	2	0	7	3	0	0	9	1	1	0	59	17	5	0	66	21	3	0	176	53	0	0
high	52	30	4	0	7	3	2	0	7	1	0	0	33	4	14	1	98	10	3	0	161	35	12	0
short	66	12	0	0	18	2	0	0	47	2	13	0	6	23	3	1	47	11	1	0	123	9	24	0
long	134	42	1	1	27	1	0	0	30	10	3	0	10	6	1	0	75	2	12	0	179	8	30	0
cold	131	128	12	1	3	10	2	0	31	7	0	0	18	28	11	7	16	0	9	0	18	2	3	0
hot	156	106	42	3	9	19	0	0	11	1	0	0	30	17	17	1	8	3	2	0	28	17	0	0
soft	171	61	10	0	17	1	0	0	1	0	0	0	87	36	30	0	20	3	6	0	25	10	16	0
hard	54	8	2	0	76	4	1	0	0	1	0	0	46	30	35	1	29	9	4	0	33	137	13	0
young	87	56	340	5	0	0	0	0	2	0	0	0	0	0	6	0	0	0	0	0	3	0	4	0
old	144	27	67	27	6	0	1	2	44	1	30	1	6	0	7	0	1	0	1	0	2	0	2	0
smooth	165	84	1	0	6	0	0	0	3	0	0	0	24	17	33	0	88	16	0	0	18	7	0	1
rough	131	30	0	0	6	1	0	0	1	0	0	0	63	28	1	0	52	4	1	0	92	13	2	0
	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

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Table 6 (cont.)

	Basic												Figurative											
	1st				2nd				3rd				1st				2nd				3rd			
	Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable		Gradable		Non-gradable	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P
slow	24	74	5	0	173	60	17	0	31	21	0	0	10	28	0	0	16	1	1	0	5	4	0	0
fast	45	21	87	0	81	16	8	0	21	10	0	0	46	9	14	0	8	0	0	0	6	3	0	0
bad	57	41	0	0	89	21	0	0	159	101	0	0	24	6	0	0	2	2	0	0	0	0	0	0
good	85	53	0	0	96	14	0	0	125	46	3	0	7	3	1	0	0	0	0	0	0	0	0	0
ugly	155	122	1	0	9	4	0	0	4	1	0	0	44	7	0	0	35	13	0	0	52	15	0	0
beautiful	279	122	0	0	13	6	0	0	15	4	0	0	17	1	0	0	5	4	0	0	19	9	0	0
poor	52	33	0	0	0	0	0	0	4	0	0	0	58	13	0	0	79	9	0	0	85	17	0	0
rich	135	103	0	0	6	2	0	0	45	10	0	0	91	15	0	0	4	0	0	0	20	15	0	1
dark	333	63	3	0	4	0	0	0	10	4	0	0	41	10	2	0	10	1	0	0	41	3	3	0
light (not dark)	157	67	2	0	4	4	0	0	7	4	0	0	5	1	0	0	0	0	0	0	6	0	0	0
closed	110	44	0	0	9	0	0	0	10	0	0	0	46	18	72	0	13	3	1	0	83	9	49	1
open	98	45	3	1	2	0	0	0	2	0	0	0	30	57	10	2	27	11	0	0	72	50	0	0
empty	242	158	0	0	0	0	0	0	5	1	0	0	19	17	0	0	7	2	1	0	27	16	0	0
full	61	15	0	0	80	0	0	0	158	0	0	0	14	1	2	0	15	1	1	0	11	2	0	0
dead	123	201	0	0	0	0	0	0	1	0	0	0	21	22	0	0	2	5	1	0	18	16	0	0
alive	0	317	0	1	0	0	0	0	0	3	0	0	0	76	0	0	0	8	0	0	0	75	0	0
heavy	131	32	40	0	63	1	3	0	58	2	4	0	70	16	12	0	15	1	2	0	14	2	4	0
light	154	61	56	1	30	4	2	0	11	3	0	0	133	40	49	0	121	27	3	0	48	11	0	0
warm	149	124	1	0	8	13	0	0	9	1	0	0	48	36	10	0	32	7	1	0	45	9	0	0
cool	104	57	8	0	7	6	0	0	5	6	0	0	49	87	14	1	40	6	1	0	42	28	0	0
	5989	**2868**	**805**	**40**	**1033**	**221**	**55**	**2**	**1211**	**282**	**65**	**1**	**1482**	**808**	**406**	**14**	**1057**	**208**	**81**	**0**	**2072**	**722**	**209**	**3**

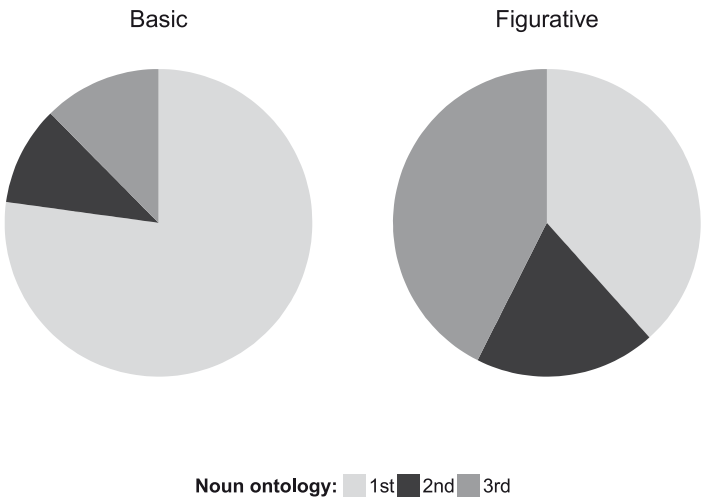

Fig. 2: Relation between figurative use and noun ontology.

The modal category, i.e., the "average adjective", is gradable (i.e., scalar or non-scalar), combines with a 1st order nominal meaning, and is used in its basic (non-figurative) sense. Adjectives in basic uses are considerably more rarely used with 2nd and 3rd order nominal meanings than with 1st order meanings. This contrasts the basic uses with those that are used in a figurative sense. Figurative use is most common with 3rd order meanings, and to a somewhat lesser degree with 1st order meanings. The relative frequency of instances of adjectives in combination with 2nd and 3rd order meanings are considerably larger for the figurative uses, as seen in Figure 2.

As can be seen in Figure 2, there is considerable variation across basic and figurative use for combinations that express nominal 1st order meanings compared to combinations with 2nd or 3rd order meanings. While most of the individual adjectives never, or hardly ever, combine with 2nd or 3rd order meanings in basic uses, there is a small group that constitutes an exception to this pattern, in that the members of this group quite regularly do, notably, *slow*, *fast*, *bad*, *good*, *large* and *full*. A similar, though less strongly pronounced, pattern could be observed among the figurative uses. The figurative uses that tend to combine with 2nd and 3rd order nouns include *weak*, *strong*, *narrow wide*, *low*, *high*, *short*, *long*, *hard*, *rough* and *poor* as well as the group of non-scalar adjectives, i.e., *open–closed*, *empty–full*, and *dead–alive*.

As for constructional use, attributive modification is more common than predicative use, across the board. The predominance of attributive use is also somewhat stronger when the adjective modifies 2nd and 3rd order nouns,

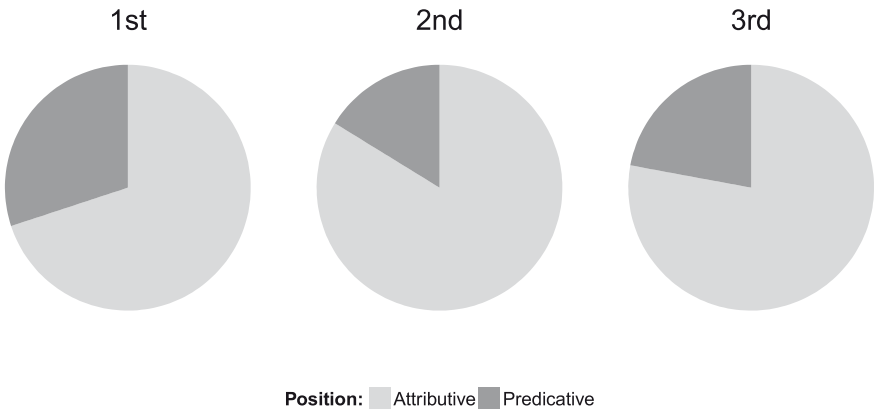

Fig. 3: Relation between adjective position and noun ontology.

as shown in Figure 3. This pattern is reversed for *alive*, which can only be used predicatively and *dead*, which is used predicatively in more than half of its occurrences.

In order to assist the interpretation of the figures in Table 6, we also applied a correspondence analysis to those data.[6] Combined, the biplot and the figures in Table 6 reveal the following patterns: The horizontal axis represents a transition from gradable use towards the left to non-gradable use towards the right. The adjectives that are often used as non-gradables are *little*, *old* and *young*, and to a lesser extent *fast*. Note that both *young* and *old* are used as non-gradables, but they differ in that non-gradable *young* occurs exclusively with 1st order nouns (19), whereas *old* combines with both 1st and 3rd order nouns, as in (20) and (21).

(19) *The* young producer *looked buoyant*.

(20) *To argue with the* old man *was pointless*.

(21) *It is a wicked* old world, *she concluded*.

Furthermore, there is an important difference between *little* as compared to its antonym *big*, in that *big* rarely occurs as a non-gradable adjective, while *little* frequently does. The same can be said about *fast* and *slow*. While *fast* is used more often than average as a non-gradable adjective (22), there are only few occurrences of *slow* used that way (23).

6 The column figurative-2nd-non-gradable-predicative was excluded from the correspondence analysis because it contains zero cells only.

Figure 4
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citation

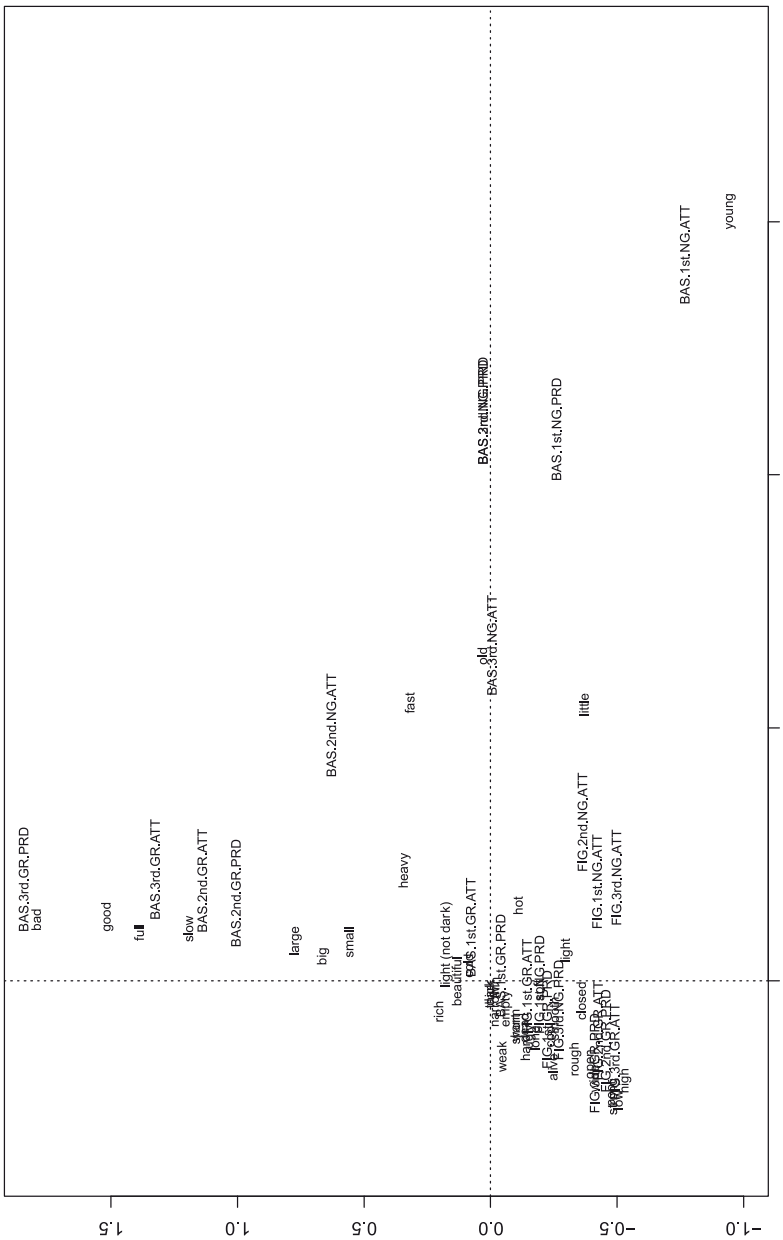

Fig. 4: Correspondence plot of the data presented in Table 6.

(22) *The Gatwick express, on the* fast track *to the private sector*.

(23) *It is like walking in* slow motion, *is it? laughed Molly alongside him*.

Another adjective that stands out as strongly non-gradable is *closed*. The difference between the previous non-gradable adjectives and *closed* is that the non-gradable instances of *closed* are all in figurative contexts (24). In this respect, *closed* differs from *open*, which is hardly ever used as a non-gradable adjective, as in (25), in our data set but may very well be in other samples. For instance, in contexts such as *open air, open source* or *open surgery*.

(24) *A* closed system *is a system in which there is no net gain or loss of matter in the system*.

(25) *HaL is unlikely to sell its chips on the* open market.

The adjectives towards the top of the biplot, to the right of the vertical axis, are those that differ from the 'average' adjective in that they more often occur in basic uses combined with 2nd and 3rd order nominal meanings. This group includes the adjectives *bad*, *good*, *full*, *slow*, *large*, *small*, *big*, and *heavy*. *Good–bad* and *large–small* are similar in this respect, while the others differ from their antonymic partners. Below are examples of basic 2nd and 3rd order uses in combination with *slow–fast* (26) and (27), *big–little* (28) and (29), *heavy–light* (30) and (31).

(26) *His* smile *was* slow, *almost lazy*.

(27) *Good looks,* fast moves *and ferociously competitive prices*.

(28) *Or perhaps the recent* tremor *was just a prelude to the really* big *one*.

(29) *He gave a despairing* little shrug *and closed his eyes*.

(30) *At home she was a queen, I never liked her to do the* heavy jobs.

(31) *There, passenger* traffic *was* light, *and was generally regarded as a nuisance*.

Furthermore, *full* deviates from its antonymic partner *empty* through its high frequency of occurrences with 2nd and 3rd order nominal meanings in contexts such as (32) and (33).

(32) *But before we go we must understand the* full import *of what we have seen*.

(33) *The number of ways of packing is reduced since the* empty volume *available becomes more and more correlated with the molecules*.

Heavy falls in-between the two groups just described in that it is an adjective that is regularly used as a non-gradable adjective, but it also combines frequently with 2nd and 3rd order nominal meanings. *Heavy* differs from its antonymic partner *light* in that it more rarely than *light* occurs in figurative contexts such as (34) and (35).

(34) *But it too carries a* heavy moral message.

(35) *Their lyrics stand up as poems, good* light verse *in their own right*.

The remaining group of adjectives is clustered around the origo of the graph, corresponding to the average adjective, which occurs more often in basic uses and in combination with 1st order meanings. The adjectives located in the bottom left-hand corner of the graph tend to be used in figurative constructions more often. For instance, we can see that *high* and *low*, which are often used figuratively, are located towards the bottom of the cluster.

7 Summarizing discussion

The 21 antonymic pairs under investigation in this study are all found to be particularly felicitously opposable antonyms in the English languages (e.g., Jones et al. 2012). They are strongly canonical pairs along dimensions that are central to humans in all walks of life in our culture and presumably in all cultures (Dixon 2009). For instance, there are *small–large, weak–strong*, *narrow–wide* and *thin–thick* that express properties of calibratable dimensions: SIZE, STRENGTH, WIDTH and THICKNESS respectively, *ugly–beautiful* and *bad–good* that are expressive of evaluative properties along the dimensions of BEAUTY and MERIT, properties along the dimension of SPEED, *slow–fast,* and properties associated with EXISTENCE. What they all have in common are the simple contentful dimensional meanings that may be configured as bounded or scalar. For each occurrence of the individual uses of the 42 adjectives in the corpus, we have examined (i) the type of configurational structure of the adjectival meanings in the corpus, (ii) their constructional usage pattern (attributive or predicative), (iii) the semantics of the nominals modified by the adjectives, and (iv) their various uses as modifiers in constructions that are "basic", metaphorical or metonymical. The overall patternings of the pairwise strength of symmetry across these parameters were calculated using correspondence analysis.

The main outcome of the study is that most of the antonymic partners pattern in a similar way with respect to their gradability configuration, i.e., as scalar,

non-scalar or non-gradable. The members of the pairs are either primarily attributive or primarily predicative. They modify the same type of nominal meanings and their usage is similar from the point of view of how they are used in terms of basic, metaphorical or metonymical meaning construals. This general finding supports the hypothesis which we set out to examine, namely that the strength of the antonymic pairings is grounded in that they pattern in the same way in text and discourse and they do so in spite of the fact that the semantic parameters of this analysis are at a general level and not geared towards the individual meaning dimensions of the antonymic pairs, which means that any one of the adjectives in this study could cluster together with any other adjective in the data set.

In addition, we also found some interesting more local patterns of similarities as well as differences. First, it is not the case that all the antonymic partners are symmetrical with respect to all four parameters that we measured. For instance, *little* and *big* differ considerably on the parameter of configuration. While *little* frequently occurs as a non-gradable adjective, *big* hardly ever does. A similar pattern is observed for the members of *young–old*, *slow–fast* and *open–closed*. According to the basic–figurative parameter, most antonym pairs most often occur with basic meanings. However, here we can also see dissimilarities. For instance, *little* occurs in figurative constructions much more often than *big* does. The same is true of *narrow–wide*, *soft–hard, smooth–rough, poor–rich, heavy–light* and *warm–cool*. With the exception of *dead* and *alive*, all adjectives are most often used to modify the nominal meanings attributively, but this too varies within some pairs. For instance, *weak* is used as a predicative modifier nearly as often as it is used attributively, while *strong* is not. This is also the case for *thin–thick*, *slow–fast* and *poor–rich*. Finally, most but not all antonym pairs combine most often with 1st order meanings of nouns. Incongruencies are seen in pairs such as *soft* and *hard*. While *soft* occurs predominantly with 1st order meanings, *hard* combines more often with 2nd and 3rd order meanings. There are three other antonym pairs that are not congruent in this respect; they are *slow–fast*, *poor–rich* and *empty–full*.

Moreover, as a by-product of the investigation we also observed interactions between the parameters that we investigated. Notably, both adjective position and figurativity appear to interact with noun ontology. The adjectives that combine with 1st order nouns occur more often in predicative position than the adjectives that combine with 2nd or 3rd order nouns. In other words, attribution is more common in the context of concrete nominal meanings than abstract meanings. We have no immediate explanation for this. Rather than speculating, we would like to refer this to future research. Also, adjectives used in figurative constructions occur more often with 2nd and 3rd meanings than adjectives used in

basic constructions. This means that, relatively speaking, there are more cases of reification than of metaphorizations proper, where metaphorization is a mapping from a 1st order meaning into a 2nd or 3rd order meaning with an invariant configuration, while reification profiles a scanned meaning of an activity (e.g., *a jog*) or a stative abstract meaning (e.g., *love*) into THING.

Unlike previous corpus studies of antonym pairs, which have looked at their semantics when they are actually used to express binary opposition, i.e., from a syntagmatic perspective, this study has focused on the semantics of such pairs when they are used individually in order describe their semantic environment also from what might be referred to as the paradigmatic perspective. On the basis of semantically analyzed corpus data of English antonymic adjectives, we have examined the usage pattern in discourse in order to determine whether their strength of goodness (canonicity) of opposability and their conventionalization as antonym pairs in language (as previously shown in the literature) is also reflected in shared usage profiles across a large number of usage events in a corpus. This way we wanted to determine whether the members of the antonymic pairs are used in the same semantic contexts and in the same type of constructions in discourse, also when they do not co-occur in the same sentence. The parameters under investigation are set at a fairly general level, so as not to provide obstacles for the individual words to cluster closely together with other words in the test set that are not their antonymic partners. The general result of the study reveals that in spite of this design, it is, in the majority of the cases, the antonymic partners that turn out as partners as shown in the correspondence plots, i.e., being most similar in terms of the parameters under investigation.

Our results thus lend support to the currently rather large number of studies concerned with antonym canonicity in the literature as reported in the introduction, and it complements the antonym literature that deals with antonym co-occurrence in text and discourse (Willners 2001; Jones 2002; Jones et al. 2007; Murphy et al. 2009; Lobanova 2012). It also lends support to a similar study of adjectives restricted to the domain of SIZE carried out by Gries and Otani (2010). While their study shares the research objective with this study, namely the quest for predictors of lexical semantic relations through behavioral profiles in text, their focus is somewhat different in terms of the scope and the parameters under scrutiny. Their study is a detailed corpus study of behavioral profiles of a large number of morphological, syntactic and semantic parameters (in total 27) of 6 adjectives in the domain of SIZE, both in their base forms, and in the comparative and the superlative. Our study, on the other hand, focuses on more purely semantic parameters. Using multivariate analysis, they measure the usage patterns of the adjectives *small, large, big, little, great* and *tiny* and show that, among the 6 size adjectives investigated, *large–small* and *big–little* cluster together, while *tiny*

and *great* appear in different clusters (*tiny* with *smallest* and *great* with *greater and greatest*) and do not seem to have canonical partners. The patterning of *large–small* is the same as in our study, where we show that *big* and *little* pattern differently from *small* and *large* in terms of figurativity and gradability and in relation to its antonymic partner *big, little* is more often used in metaphorical and in non-gradable contexts.

Gries and Otani (2010) also bring up the long-standing controversy in antonym research between the co-occurrence hypothesis, i.e., antonym co-occurrence in the same sentence, on the one hand, and the substitutability hypothesis on the other. They relate the two and say that the notion of contextual representations suggested by the substitutability hypothesis ties nicely in with the basic tenet of the co-occurrence hypothesis through the notion of contextual representation. We agree with their interpretation of the implications of their work in the SIZE domain. Our findings, based on a data set of 21 such dimensions, speak in favor of their statement. Following up on the discussion of the two Structuralist approaches to meaning in language, i.e., the paradigmatic and the syntagmatic approaches, these results, like the results presented by Gries and Otani (2010) suggest that from an empirical point of view there is no real conflict between the co-occurrence hypothesis, i.e., two antonyms are good antonyms because they co-occur frequently in the same sentences (Justeson and Katz 1991), and the substitutability hypothesis, i.e., they are good antonyms because they are interchangeable in most contexts (Charles and Miller 1989). The reason for this is that, if two adjectives are antonyms, they share the same meaning dimension and if they are relational meanings as adjectives are they then modify the same meaning structure of another element, i.e., both hypotheses are in essence contextual and syntagmatic in nature. In other words, proponents of the co-occurrence hypothesis and proponents of the substitutability hypothesis operationalize the effect of context in two different ways. The upshot of both views is that antonymy is a contextual construal (Jones et al. 2012). One possible reason for the controversy is that neither camp has taken the semantics of the lexical forms seriously, or been able to account for the semantics of antonymy. This has resulted in cross-purposive arguments and missed points in a conflict where there is none.

8 Conclusion

The findings presented in this study provide additional support to the currently rather large number of studies on antonyms and antonymic word meanings, using a variety of different techniques, both corpus methodologies, behavioral

and neurophysiological experiments, in that antonymic pairs judged to be members of the category are similar in all respects but one, namely that they evoke properties at opposite sides of a boundary or ends of a scale of a meaning dimension. Canonical antonymic partners are maximally similar and minimally different. This large-scale, manually coded corpus study shows that antonymic partners appear in similar semantic environments in discourse also when they are not used to express oppositeness. These findings reduce the Structuralist debate about the two approaches to a non-question showing that their lexical relational modelling of meanings is deficient in that it does not take word meaning in use seriously, neither the paradigmatic nor the syntagmatic camp.

Instead, the usage-based claim in Cognitive Linguistics is that we understand words and constructions based on how they are used in human communication, and lexical knowledge is acquired and built up on the basis of their use in discourse, irrespective of whether they might be seen to form a paradigm or a syntagm (Tomasello 2003, 2008; Bannard et al. 2009). Antonymy is grounded in similarity of usage (Paradis and Willners 2011). These findings allow us to explain the close relationship between antonyms through their pairwise similarities, which is the kind of tacit knowledge that speakers build up through life and which becomes entrenched in memory, i.e., the total meaning and use potential of a lexical item as posited by Paradis (2003, 2005, 2016). These pairwise similarities across usage events described in this article do not necessarily reflect conscious lexical knowledge but rather tacit lexical knowledge at some level that can only be uncovered through careful scrutiny of their actual use across large numbers of occurrences by analysts, or through tapping into people's minds in experimental settings. What this particular study contributes to the long line of previous work on speakers' knowledge and assessments of antonymic couplings, antonym canonicity, and antonym use in language is that antonyms are in fact used in the same semantic contexts in text and discourse even when they are not used to express opposition. The approach to meaning in language and to the nature of lexical knowledge presented in this study is truly usage based, which entails that lexical knowledge both emerges and develops through language use, in which case strength of antonymy can be seen as an epiphenomenon of usage entrenchment.

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