Antonymy

from convention to meaning-making*

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Abstract
This article offers a Cognitive Semantic approach to antonymy in language and thought. Based on a series of recent empirical investigations using different observational techniques, we analyze (i) the nature of the category of antonymy, and (ii) the status of its members in terms of goodness of opposition. Our purpose is to synthesize these empirical investigations and provide a theoretical framework that is capable of accounting for antonymy as a mode of thought in language use and meaning-making. We show that antonymy has conceptual basis, but in contrast to other lexico-semantic construals, a limited number of words seem to have special lexical status as dimensional protagonists. Form–meaning pairings are antonyms when they are used as binary opposites. Configurationally, this translates into a construal where some content is divided by a BOUNDARY. This configuration (or schema) is a necessary requirement for meanings to be used as antonyms and all antonyms have equal status as members. In contrast to categorization by configuration, categorization by contentful meaning structures forms a continuum ranging from strongly related pairings as core members to *ad hoc* couplings on the outskirts. In order to explain why some lexico-semantic couplings tend to form conventionalized pairs, we appeal to their ontological set-up, the symmetry of the antonyms in relation to the BOUNDARY between the meaning structures, their contextual range of use and frequency.

Keywords: oppositeness, corpus, categorization, psycholinguistic experiment, construal, configuration, schema, lexico-semantic relation, frequency, synonymy, constructions

1. Introduction

The most challenging and at the same time most intriguing problem in lexical semantics is the flexibility of word meaning and its sensitivity to context. The malleability of words in context creates difficulties for the description as well as for the explanation of word meaning as such, words in use, their combinatorial patternings in constructions and their lexico-semantic relations to other word meanings in language. The relation of antonymy is a particularly interesting case in point.[1]

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[1] The way we are using the term antonymy is as a cover term for form–meaning pairings that are used in binary opposition in language use. In this study, binarity receives a BOUNDEDNESS definition of partition into two parts in conceptual space and opposition is a construal based on dimensional alignment and comparison. In some of the literature, antonymy is confined to binary opposition between contrary meanings in language, such as *good–bad*, as opposed to other opposites in language, such as converses, e.g. *buy–sell* and complementaries, e.g. *dead–alive* (Lyons, 1977; Murphy & Andrew, 1993; Cruse, 1986; Croft & Cruse, 2004; Paradis, 1997, 2001; Lehrer, 2002).

Previous research has shown that, at the one extreme, there is a limited number of word pairings that appear to be *the* exponents of antonymy along certain meaning dimensions. Examples of such antonyms are *good–bad*, *heavy–light*, *hot–cold* and *slow–fast* (e.g. Herrmann et al., 1986; Fellbaum, 1995; Gross & Miller, 1990; Justeson & Katz, 1991; Willners, 2001; Jones, 2002). They are strongly conventionalized couples along the semantic dimensions of MERIT, WEIGHT, TEMPERATURE and SPEED respectively. When asked about their opinion of how good a pair of lexical items are as antonyms, speakers prefer *slow–fast* to pairings such as *slow–rapid, slow–express* and *slow–blistering*. At the other extreme, antonymy may be construed for purposes of originality or poetic effect as in 'the opposite of *tomato* is *listening to the snow falling'* (emphasis added).[2] Such antonym construals require explicit contextual motivation in order for them to be understood as a binary contrast of opposing elements. In between those two extremes, there are numerous pairings that similarly to *slow–rapid, slow–express* and *slow–blistering* need a fair amount of contextual boosting to make proper sense as opposites, e.g. 'I prefer *calm* dogs to *high-strung* dogs', 'I prefer *calm* waters to *flowing* waters', 'I prefer a *calm* public to an *agitated* public' and 'I prefer *calm* conversation to *flame* warring'. The various different antonyms of *calm* appear to be bound up with particular domains (Murphy & Andrew, 1993; Paradis, 2005) and in particular constructions (Goldberg, 1995, 2006; Croft, 2001; Murphy, 2006; Boas, 2008). On the one hand, all the above examples are no doubt on a par with one another as antonyms, but, on the other, speakers of English consider pairings such as *good–bad*, *heavy–light*, *hot–cold* and *slow–fast* to be particularly good examples (Paradis et al., 2009).

The primary goal of this article is to provide a theoretical account for the category of antonymy that is capable accommodating antonyms ranging from strongly conventionalized lexico-semantic couplings to strongly contextually motivated pairings. The theoretical approach adopted is *broadly* that of Cognitive Semantics (Langacker, 1987; Lakoff, 1987; Talmy, 2000; Cruse, 2002; Croft & Cruse, 2004), more precisely Lexical meaning as ontologies and construals (LOC for short; Paradis, 2005). The below two questions at the heart of the study will receive a self-consistent analysis within LOC.

- *What* are the categorial characteristics of antonymy in language?
- *Why* are some pairings 'better' than others?

Pre-theoretically, antonymy is defined as binary opposition in language and thought. Based on recent textual and experimental research, this article offers a new take on antonymy. The analysis falls into two different but interrelated parts in which each of the above two questions are addressed. In answer to the first question concerning categorization of antonymy, the argument is that antonymy is a binary opposition of some content. Opposition is a binary construal of *comparison* in which the contentful dimension is aligned and divided by a BOUNDED configuration. The configuration of BOUNDEDNESS constitutes an absolute and necessary requirement for meanings in a certain content segment to be used as antonyms (irrespective of the whether the configuration of the opposing elements against which the contrast is profiled is BOUNDED or UNBOUNDED). In contrast to this definition of antonymy by configuration (or schema), the categorization of antonymy by contentful meaning structures forms a continuum in that some pairings are 'better' pairings of binary opposition than others. The structure of the category of antonymy from the point of view of the content segment is one of prototypicality, with canonical pairings as core members and *ad hoc* couplings on the

[2]The text is accompanied by a drawing by James Rowley of a place in Spitzbergen. The source of the drawing is a photograph published in *The Guardian* 26/02/08 (Spitzbergen): http://aesthetesfoot.blogspot.com/2008/03/today-opposite-of-tomato-is-listening.htmlgraphite/30x20cm original source.

outskirts.[3] Secondly and in answer to the second question, the article attempts to untangle the question of the nature of the meanings of the more canonical, conventionalized antonym pairings as opposed to all other pairings that have no obvious partners, and it does so by appealing to their ontological set-up in terms of the salience of the contentful dimension as well as the configuration of the members that form part of the of opposition, the symmetry of the members of the antonymy in relation to the BOUNDARY between the members of the pairs, their contextual range of use and their frequency. Lexical items that are strongly coupled with an antonym partner in language according to various different empirical indicators are all what we might refer too as inherently binary along a salient contentful segment.

The structure of the article is as follows. Section 2 reviews a selection of studies of antonyms in lexicographical works, in corpora and in experimental data. Section 3 presents a short critical discussion of previous Structuralist treatments of antonymy followed by a presentation of the basic assumptions of the LOC model. In Sections 4 and 5, the two structurally different types of categorization of antonymy are introduced: categorization by content and categorization by configuration. Having thus established the foundation for the issue of why some meanings conventionalize, while others do not. We analyze the characteristics of good, better and excellent antonym pairings in Section 6. Finally, the arguments based on the empirical findings are synthesized and concluded in section 7.

2. Lexicographical, textual and psycholinguistic evidence of antonymy

It is well-known to both lay people and researchers interested in the meaningful functioning of language that antonymy, as it is defined here, i.e. as a binary contrast used in order to express opposition, is a commonplace in all kinds of communicative modalities and registers: written as well as spoken, fact as well as fiction and formal as well as informal varieties. Antonymy is also important in the design of iconic signs, such as traffic signs, and in visual works of art of different kinds (Giora et al., 2009). Further evidence of the importance of antonymy in language and thought is that it is often the basis of great quotes (for reasons of clarity emphasis added in all examples) such as ‘The most beautiful things are those that *madness* prompts and *reason* writes.’ (André Gide), ‘Timid men prefer the *calm* of *despotism* to the *tempestuous* sea of *liberty*.’ (Thomas Jefferson) or ‘A *joke* is a very *serious* thing.’ (Winston Churchill).

The ubiquity of antonymy, however, does not render it uninteresting for research or useless as a structuring device. On the contrary, binary contrast is an extremely powerful organizing principle in perception and cognition and therefore also a very efficient tool in argumentation, narration, explanation and description (Lloyd, 1966, Bianchi & Savardi, 2008). In contrast to most previous work on antonymy, this study straddles the whole continuum from conventionalized word pairings in languages to highly contextually motivated and creative antonymy. Before we launch into the differences with respect to categorial structure, we will give a brief report of the empirical research as matters currently stand with respect to the treatment of antonyms in lexicography, in textual and in experimental research.

[3] The more canonical antonyms are closely linked both semantically and lexically, while the less canonical or non-canonical members of antonym couplings are antonyms only by virtue of their semantic incompatibility when they are used in binary contrast in order to be opposites (Paradis et al., 2009).

2.1 Antonyms in dictionaries

The pervasiveness of antonymy in language and thought manifests itself in a number of ways. Cruse (1986) and Croft & Cruse (2004) point out that antonymy is the most robust among the lexico-semantic relations. Native speakers in all walks of life are intuitively aware of antonymy. It is important in language acquisition and learning (Jones & Murphy, 2005; Murphy & Jones, 2008; Tribushinina, submitted) as well as in lexicography and in lexicographical work targeting language learners (Fellbaum, 1998; *Princeton WordNet*[4], Paradis & Willners, 2007; Storjohann, 2009).

Some dictionaries systematically indicate antonyms of headwords that are considered to be frequently associated with a partner. One such dictionary is *Collins Cobuild Advanced Learner's English Dictionary* (2003). The treatment of antonyms in *Collins Cobuild Advanced Learner's English Dictionary* has been examined in a study by Paradis & Willners (2007). The rationale behind our investigation is that dictionaries in general and learners' dictionaries in particular are important tools in the process of acquiring foreign languages and that the main goal of a learner's dictionary informed by a large corpus, such as *Collins Cobuild Advanced Learner's English Dictionary,* is to provide learners with idiomatic and useful information that will help them set up native-like links between words and meanings. Our investigation shows that, as expected, far from all headwords are provided with an antonym. The majority of headwords for which antonyms are given in the dictionary are adjectives (59%) followed by nouns (19%), verbs (13%) and adverbs and prepositions (9%). Most of the adjectival pairings are gradable, either UNBOUNDED meanings expressing a range on a SCALE such as *good–bad*, or BOUNDED meanings expressing totality, such as *dead–alive* (as defined and developed in Paradis, 1997, 2001, 2008), but there are also non-gradable antonymous adjectives such as *male–female*. An important observation in the study is that there are clear similarities across the meanings of the headwords for which antonyms are provided in the dictionary in that they are all what we might call inherently binary (we return to this issue in Section 6).

Another lexical resource that systematically provides information about lexico-semantic relations is *Princeton WordNet*, whose entire structure is based on lexico-semantic relations between words.[5] The structure of the lexical resource is thus that of a thesaurus and not a dictionary in the sense that word meanings are defined on the basis of relational constraints rather than through definitions and paraphrases of words (Fellbaum, 1998; Murphy, 2003, pp. 104–113). The basic relation of Princeton WordNet is synonymy. All words in the thesaurus form part of at least one synonym set. If a word has more than one sense, it is represented in more than one synonym set. Figure 1 shows the Princeton WordNet model for the antonym pair *dry–wet* (Gross & Miller, 1990, p. 268). *Dry* in this sense is a member of the synonym sets to the right in Figure 1 (*parched, arid, anhydrous, sere, dried-up*) and *wet* is a member of the synonym sets on the opposite side (*watery, damp, moist, humid, soggy*). The WordNet model distinguishes between direct and indirect antonyms. Direct antonyms, such as *dry–wet*, are lexically related while all the others are indirect antonyms, linked to the direct antonyms by virtue of their being members of their conceptual synonym sets, i.e. *moist* is an antonym of *dry* mediated by *wet*.

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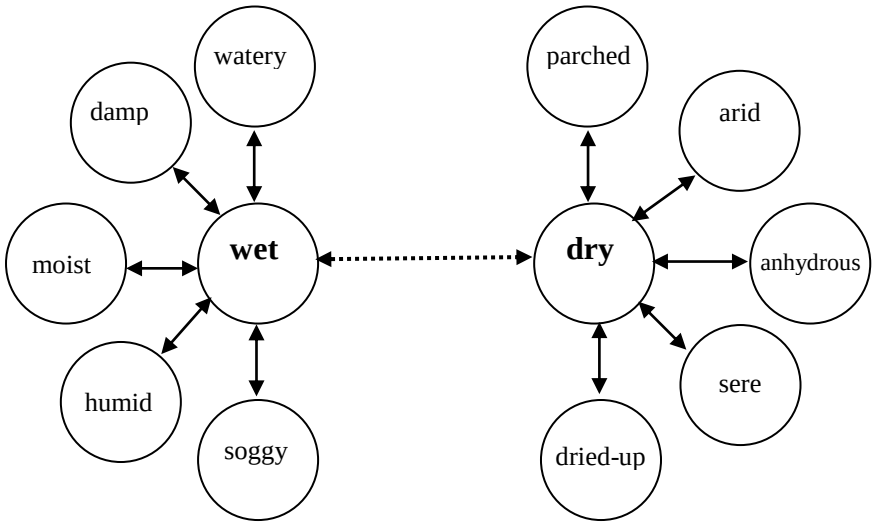
[4] The Princeton WordNet: http://wordnet.princeton.edu/man/wngloss.7WN

[5] Although, the initial goal of Princeton WordNet was to create a lexical reference system designed to be a psychologically realistic model of our mental lexicon and at the same time a useful online lexical database (Miller et al., 1990), it is only as an electronic tool that it has survived. Initially, Princeton WordNet was intended to encode information from psycholinguistic sources only. This turned out to be an impossible strategy though, since only a minor part of the English vocabulary had been experimentally investigated. Due to the want of data supply, the WordNet project had to employ traditional lexicographic methods for the design and implementation of the database (Beckwith & Miller, 1990).

Figure 1. The direct relation of antonymy as illustrated by *wet* and *dry*. The synonym sets of *wet* (i.e. *watery, damp, moist, humid, soggy*) and *dry* (i.e. *parched, arid, anhydrous, sere, dried-up*) appear as crescents round *wet* and *dry* respectively. They are all indirect antonyms of the direct ones (the figure is adapted from Gross & Miller, 1990, p. 268)



The direct antonyms are central to the structure of the adjective vocabulary in the Princeton model. Since the lexical structure of the Princeton WordNet presupposes the existence of direct antonyms, there is a need to make up place-holders for missing members. For instance, *angry* has no partner and therefore UNANGRY is supplied as its antonym (Willners, 2001). Clearly, lexical gaps of this kind pose both explanatory and descriptive problems for their model. The psychological plausibility of direct and indirect antonyms as well as its theoretical value has recently been questioned by Paradis et al. (2009) and Willners & Paradis (2010). Both studies allow for a restricted set of canonical antonyms, which is the term we use for strongly conventionalized couplings. In our view, antonymy is always a construal in conceptual space; canonical pairings are closely linked both semantically and lexically, while members of non-canonical antonyms are opposites only by virtue of their semantic incompatibility when they are used in binary contrast in order to be opposites and are not conventionalized pairs in language use or entrenched couplings in memory (see Section 6). Divjak & Gries (2008) have arrived at similar results for synonyms, namely the existence of mental correlates of lexical clusters.

2.2 Antonyms in corpora

There are a number of important studies on antonyms in text and discourse that describe their behaviour and use patterns (e.g. Mettinger, 1994, 1999; Fellbaum, 1998). Following up on Charles' & Miller's (1989) proposal that lexical associations between adjectival antonyms are formed through co-occurrence in sentences (the co-occurrence hypothesis) rather than substituting for one another in the same syntactic context (the substitution hypothesis), Justeson & Katz (1991, 1992) show that very high co-occurrence rates appear for antonymous adjective pairs – a finding they claim to support the precondition for the formation of associations between words as shown experimentally by for example Deese (1964, 1965). Like Justeson & Katz, Willners (2001) establishes that antonyms tend to co-occur at higher

than chance rates in sentences, and that the 'direct' antonyms of Princeton WordNet co-occur significantly more often than the 'indirect' antonyms as well as all other semantic relations. Methodologically, Willners' algorithm is at an advantage over Justeson's & Katz' algorithm in that it also takes sentence length into account in the calculations (Willners & Holtsberg, 2001). Paradis et al. (2009) do not only show that antonyms co-occur sentientially more often than chance, but also that some pairings stand out as exceptional in this respect. Examples of such pairings are *good–bad, wide–narrow, dark–light, thin–thick, weak–strong* and *fast–slow*. For the dimension of SPEED, *fast–slow* represent the strongest co-occurrence pair. Other antonym pairs co-occurring with a *p*-value lower than 10^{-4} that were thrown up using this method are *rapid–slow, delayed–immediate, gradual–immediate, gradual–sudden* and *quick–slow*.[6]

Importantly, the above studies show that textual co-occurrence of antonyms is by no means restricted to set phrases such as *the long and the short of it, through thick and thin* or *neither here nor there*, but antonym pairs co-occur across a large range of different phrases. Jones (2002) identified a number of discourse functions of antonyms, each of which is associated with a number of different contrastive constructions, e.g. *more X than Y, difference between X and Y, X rather than Y*. Subsequent studies (Jones, 2007, Jones & Murphy, 2005, Jones et al., 2007, Murphy & Jones, 2008) have demonstrated that these functions are widespread in text, albeit with some distributional differences in different languages (Murphy et al., 2009) on Swedish antonyms, Muehleisen & Isono (2009) on Japanese antonyms).

2.3 Antonyms in psycholinguistic experiments

Psycholinguistic studies of antonyms have established the tendency for antonyms to elicit one another in free word association experiments (Palermo & Jenkins, 1964; Deese, 1965; Charles & Miller, 1989; Paradis et al., 2009; Willners & Paradis, 2010) and the tendency for speakers to identify them as antonyms at a faster speed than other word pairs (Herrmann et al., 1979; Gross et al., 1989; Charles et al., 1994). For instance, in semantic priming tests, 'good' antonyms have been found to prime each other more strongly than less good antonyms (Becker, 1980). In one of their experiments, Herrmann et al. asked informants to rate word pairs on a scale from one to five. From the results of their experiment it emerges that there is a scale of 'goodness of antonyms' from 'perfect antonyms' to 'not antonyms at all' with scores ranging from 5.00 (*maximize–minimize*) for 'perfect antonyms' to 1.14 (*courageous–diseased, clever–accepting, daring–sick*) at the other end of the scale. Their interpretation of the results is that the degree of antonymy is influenced by three parameters, namely that the two words are denotatively opposed; that the dimension of denotative opposition is sufficiently clear; and that the opposition of two words is symmetric around the centre of the dimension.

Paradis et al. (2009) question both Herrmann et al's view that antonymy is a completely scalar phenomenon and the categorical WordNet view that there is a set of canonical antonyms (or direct in our terminology) in language that are represented in the lexicon and another set of indirect antonyms that are not represented as pairs in the lexicon, but are indirect antonyms by virtue of the fact that their opposition is mediated by the direct antonyms (see Figure 1). We claim that, generally speaking, antonymy is conceptual in nature, but some pairings are also strongly coupled as lexical items. Yet, to some extent different methodologies yield different results depending on the focus of the study. For instance, while our judgement experiment indicates that there are two significantly different types of antonym opposability – canonical and non-canonical, our elicitation experiment

[6] It should be noted that also potential synonym co–occurrences, such as *sudden–swift, dull–tedious, dumb–stupid* and *fast–high-speed* as well as pairs that are unlikely to be antonyms or synonyms in any context such as *dense–hot* are identified using this algorithm.

points up a continuum of antonym affinity between words. We also show that while those strongly conventionalized antonyms are few, there is a large number of more or less strongly conventionalized pairings across contexts and within certain genres.

In sum, while there is a large range of antonym pairings at different levels of lexico-semantic strength of antonym affinity and opposability, there is most clearly also a core of very strongly coupled antonyms in language and thought as shown through the lexicographical, textual and psycholinguistic studies in this section.

3. Content, configurations and the construal of antonymy

For decades, research on lexico-semantic relations was tied up with the Structuralist approach to meaning within which language is conceived of as an autonomous system of paradigmatic (Saussure, 1959 [1915]; Lyons, 1977; Cruse, 1986; Lehrer & Lehrer, 1982) and syntagmatic (Firth, 1957; Halliday, 1994; Sinclair, 1987) relations between words. Meaning in language, according to the Structuralist approach, is the relations between the words in a specific language. Even though lexico-semantic relations were the particular focus of the paradigmatically oriented Structuralists, their research did not achieve very much in terms of explanation for the phenomena as such. However, with the advent of the Cognitive approach to meaning and the development of corpus methodologies, experimental techniques and computational facilities, the basis for research on word meaning and lexico-semantic relations has radically changed. The scope of the analysis of word meaning in general and lexico-semantic relations has broadened to include also aspects of constructions, text and discourse as well as aspects of memory and thinking. Language in natural communicative situations involving speakers and addressees has come to enjoy pride of place in Cognitive Linguistic research and the combination of the theoretical and empirical developments has sparked new interest in research on lexico-semantic relations and their functions in language and thought (e.g. Storjohann, 2010). This article argues in favour of a conceptually based dynamic construal approach to binary contrast in conceptual space (Paradis & Willners, 2006, submitted, cf. Gries & Otani, 2010). Antonymy, on this view, is a construal of thought and lexical items are antonyms when they are used contrastively in order to be opposites (Murphy, 2003, pp. 42–60; Paradis et al., 2009).

The main tenet in Cognitive Semantics is that meanings are mental entities in conceptual space. Meanings are in people's minds rather than being independent entities in the external world, as is the case in objectivist models, or relations within language, as in Structuralism. Some scholars within the Cognitive school of thought argue that lexical items do not 'have' meanings, rather they are cues for making inferences that promote adequate reasoning and understanding (Cruse, 2002; Paradis, 2005; Verhagen, 2005, p. 22). Linguistic items evoke particular conceptual structures when they are used in specific constructions in text and discourse (Traugott, 2007; Ruiz de Mendoza Ibáñez & Mairal Usón, 2007; Suttle & Goldberg, submitted, Paradis submitted), and lexical meaning is the relation between lexical items and the part of the use potential profiled on the occasion of use. Lexical meaning is emergent and constrained by encyclopaedic knowledge, conventionalized mappings between lexical items and concepts, conventional modes of thought in different contexts, constructions and situational frames (Cruse, 2002; Paradis, 2003). On this view, meanings of words are always negotiated and get their definite readings in the specific constructions and contexts where they are used. Multiple readings of words and expressions do not pose problems to the theory. On the contrary, they are natural and expected in a dynamic model such as LOC, where usage patterns and meaning-making principles are central.

In LOC, conceptual space is structured relative to two types of ontological knowledge structures: contentful and configurational structures (see Table 1).

Ontologies (conceptual structures)		Cognitive processes
Content	Configurations	Construals
CONCRETE PHENOMENA EVENTS, PROCESSES, STATES ABSTRACT PHENOMENA	PART/WHOLE, THING, RELATION, BOUNDEDNESS, SCALE, DEGREE, POINT, FREQUENCY, FOCUS, PATH, ORDER, MODALITY, …	*Gestalt*: e.g. structural schematization *Salience*: e.g. metonymization, generalization, profiling *Comparison*: e.g. metaphorization, categorization, analogy *Perspective*: e.g. foregrounding /backgrounding, subjectification

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

Both types of structures are conceptual pre-meanings that receive their full interpretation when they are used in text and discourse.[7] Content structures involve meaning proper, i.e. meaning structures pertaining to CONCRETE PHENOMENA, EVENTS, STATES, ABSTRACT PHENOMENA, and configurations are schematic templates such as BOUNDARIES and SCALES.[8] In addition to these conceptual representations, there is an operating system consisting of different types of *construals* such as assignment of Gestalt and focus of attention (salience). Construals are imposed on the concepts by speakers and addressees at the time of use and thereby establish the definite contextual reading (Langacker, 1987, 1999; Paradis, 2004, 2005, 2008).[9] A great deal of flexibility is built into LOC in that configurational concepts are free structures that are mapped onto different content domains. This also makes it possible for us to apply different configurations of one and the same contenful meaning structure such as the construal of different parts-of-speech on the basis of, say, WIDTH, e.g. *wide, width* and *widen* (Paradis, 2005, pp. 546–549), or the construal of content structures on the basis of SCALE or BOUNDARY as in *very good*, which is construed on the basis of a SCALE and *completely good* where a BOUNDARY is profiled (Paradis, 2008). The advantage of LOC is that it is a highly dynamic model in which we are able to treat both conventionalized and more *ad hoc* couplings between configuration and content, as will be demonstrated in this article.

[7] This is similar to Cruse's term, *purport* (Croft & Cruse, 2004, pp. 100–1).

[8] Talmy (2000, pp. 24–40) also distinguishes between two types of conceptual structure, the contentful subtype and the schematic subtype. Open-class meanings represent the former and closed-class meanings the latter. Closed-class meanings are constrained by various neutralities, e.g. bulk neutrality (abstracted away from the bulk of bodies in space and reduced to points, lines and the like), magnitude neutrality, shape neutrality, token neutrality and substance neutrality. It should be noted that content and configuration structures in LOC are not bound up with word classes as in Talmy's model.

[9] Construals have been described in the Cognitive literature by Talmy (2000) in terms of schematic systems, which embrace configurational structure, deployment of perspectives, distribution of attention and force dynamics. Langacker (1987, pp. 99–146, 1999, pp. 3–5) deals with construals under the rubrics of comparison, attention and focal adjustments. The focal adjustments are further subdivided into selection of the facets of a particular scene, the perspective from which a scene is viewed and the level of abstraction or level of specificity. Lakoff & Johnson (1980) treat construals under metaphor.

4. Categorization by content structures

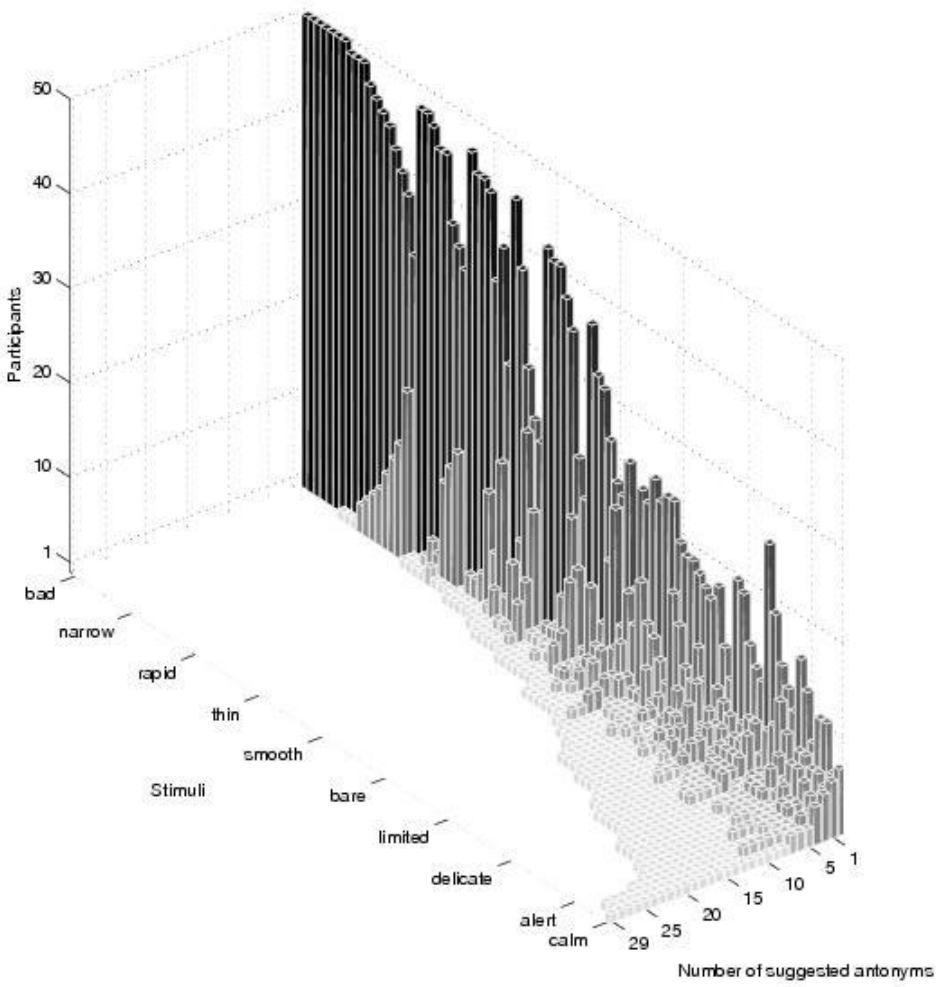
Using both textual and experimental methods, Paradis et al. (2009) investigated 85 adjectives in English. The textual study was corpus-driven, and the searches were performed on the whole of the British National Corpus (the BNC) using an algorithm designed to identify pairings of words in the corpus (Willners & Holtsberg, 2001). Our method was of a two-step type in that we mined the whole corpus for both individual occurrences and co-occurrence frequencies for all adjectives without any restrictions, and from those data we then selected seven meaning dimensions with co-occurring antonymic adjectives of outstanding frequency: they were *weak–strong, small–large, light–dark, narrow–wide, thin–thick, bad–good, slow–fast*. These pairs are also all direct antonyms in Princeton WordNet. All the synonyms of those 14 adjectives were subsequently retrieved from Princeton WordNet. In the second step, the BNC was searched in order to identify sentential co-occurrences of potential antonyms in text, using the 14 adjectives and all their synonyms as search items. In total 68 364 possible permutations were run through the corpus. It was shown that the fourteen initial antonyms were identified as more strongly co-occurring than all other pairings within each dimension. In Willners & Paradis (2010), we replicated the corpus-driven and the experimental investigations of English in Swedish, yielding the same results.

The co-occurring antonym pairings retrieved from the BNC were then used as test items for two subsequent experiments: an elicitation and a judgement experiment. The pairings for the experiments were selected from the combinations that occurred five times or more with *p*-values lower than 10^{-4} in the corpus.[10] In the elicitation experiment the participants were asked to provide an antonym of a given word, without global context, and in the judgement experiment participants were asked to rate pairs of words, again without global context, on an eleven-point scale according to their judgement of how good they thought the pairings are as antonyms. It was confirmed that the seven adjective pairs that came out the strongest in the textual study of sentential co-occurrence, were also the ones that received the highest scores in both experiments. This was most clearly shown through the outcome of the judgement experiment since the design and the statistical calculations of that experiment were geared towards the boundaries of the more canonical antonyms. The elicitation experiment, on the other hand, was intended to shed light on the internal structure of the pairings and pointed up a continuum from excellent antonym pairings with total participant consensus to pairings with a steady decrease in agreement.

The outcome of both the experiments and the corpus-driven study converge in a picture of the category of antonymic lexical meanings in English as a prototypicality structure with a small number of category members with excellent antonym partners to category members on the outskirts for which a partner does not readily seem to come to mind. Figure 2 gives the complete three-dimensional picture of the responses. The X-axis gives the total number of the antonyms suggested across each test word. The Y-axis shows all the test items of which every tenth word is supplied along the axis. The Z-axis shows the number of participant responses given per antonym. The bars represent the various elicited antonyms in response to the test items. The height of the bars indicates the number of participants who suggested the antonym in question. There is a gradual decrease across stimuli in participant agreement of the best antonym for a given word. The low bars at the bottom of Figure 2 represent a single antonym suggested by only one experiment participant.

[10] The reader is referred to Paradis et al. (2009) for a proper description of the rather complicated method of data extraction for the experiments.

Figure 2. The distribution of English antonyms in the elicitation experiment. The Y-axis lists the stimuli (85 all in all), with every tenth stimulus written in full. The x-axis lists the number of antonyms suggested by the participants (from 1 to 29). The z-axis lists the number of participants across each stimulus (varying between 1 and 50) (Paradis et al., 2009)



Furthermore, Appendix A lists all the test items suggested by the participants. At the top of the list are the test items for which the participants only suggested one antonym: *bad* (*good*), *beautiful* (*ugly*), *clean* (*dirty*), *heavy* (*light*), *hot* (*cold*), *poor* (*rich*) and *weak* (*strong*), then the test items for which the participants suggested two antonyms, e.g. *narrow* (*wide*, *broad*) and *slow* (*fast*, *quick*), the stimulus words with three different answers and so on. The very last item is *calm*, for which 29 different antonyms were suggested by the 50 participants. The shape of the list of elicited antonyms strongly suggests a scale of canonicity from very good matches to test items with no preferred partners. The discussion of these aspects will be continued in Section 6.[11]

The seven pairs that scored highest in the corpus-driven study did not only occur most frequently together in a sentence, but they were also most frequent individually. This does not mean that items that are less frequent in language cannot form strongly conventionalized pairings. For instance, had we included less frequent words such as *maximize–minimize*, it is most likely that they would have scored high both in terms of sentential co-occurrence and in the experimental investigations, as indeed was shown by Herrmann et al. (1986). Nevertheless, the adjectives at the top are very frequent in language use, both in terms of their individual and their co-occurrence frequency. Using a Spearman rank order correlation test, Paradis (2010) determined that there is a correlation between the individual frequency of the test items and the number of antonyms suggested by the participants in the elicitation experiment. The coefficient is – 0.62 and the correlation is significant at the 0.01 level (two-tailed).

In another study, the World-Wide-Web was used as corpus for identification of strength of antonym couplings (Jones et al., 2007). The issue of antonym canonicity was approached by building specifically on research that has demonstrated the tendency of antonyms to favour certain constructions in discourse, such as *X and Y alike*, *between X and Y*, *both X and Y*, *either X or Y*, *from X to Y*, *X versus Y* and *whether X or Y*, identified by Jones (2002). The point of departure for that study was that canonical antonyms, such as the high-scoring pairings in the textual and the experimental studies described in Section 2.3, could be expected to co-occur with high fidelity in such constructions. Fourteen contrastive constructions were used for identification of a range of contrast items (see Appendix B) across a number of seed words, and strong correlations emerged between those adjectives that were found to be as 'good opposites' in the elicitation experiments. As a matter of fact, in the case of nine of the ten seed words selected as a starting point for the web searches, i.e. *beautiful*, *poor*, *open*, *large*, *rapid*, *exciting*, *strong*, *wide*, *thin* and *dull*, the adjectives retrieved most often in searches were the same as the adjectives that were suggested by the participants in the elicitation experiment.[12]

On this account, assessment of the structure of the category of antonymy based on the contentful side of the meanings point to a prototypicality structure that forms a continuum from antonyms, good antonyms, better antonyms and excellent antonyms.

5. Categorization by configuration construal

So far, a large number of examples of antonyms at different levels of opposability have been identified through lexicographic, textual and psycholinguistic investigations and through examples from other sources suggesting a continuum. However, while the affinity is strongly

[11] See Willners & Paradis (2010, pp. 45–47) for a list of elicited antonyms in Swedish.

[12] Only *thin* did not retrieved *fat* most frequently in the web study, but the antonym that was most frequently retrieved by *thin* was instead *thick*, which ranked second in the elicitation experiment (see Appendix A). However, there was agreement between the corpus-driven ranking described in Section 2.2.

supported by the various different empirical investigations, for some of the antonym pairings, and less strongly, or not supported at all, for other antonym pairings, all of them are used as antonyms in the contexts where they occurred or were contextualized by the participants in the experiments. From this point of view, there exists a category of antonymy, which unlike the prototype-structured one, based on the contenful meaning dimension, has no inherent structure and for which the criteria either apply or not.

Murphy (2003, p. 45) argues for a general pragmatic principle, the Relation-by-Contrast, governing all semantic relations, i.e. antonymy, synonymy, co-hyponymy, hyponymy and meronymy. The principle defines relations on the basis of minimal differences. For antonyms the contrast relation holds among the members of a pair if and only if they have the same contextually relevant properties but one. We take this definition as our point of departure and complement it with our Cognitive Semantic approach to antonymy, which offers a semantic explanation for antonymy in language and thought and which offers an account for why some lexical items form set coupling (Section 6). What then constitutes the common ground and the defining properties of all antonym construals? Using the terminology of LOC, we define antonymy as a binary contrast in which the two form–meaning pairings are used as opposites. This binary opposition is effected through a construal of comparison in which a contentful dimension (x) is divided by a BOUNDED configuration and the meanings on either side of the boundaries are used and understood as opposites. What is stable across all instances of antonymy is the partition of the underlying contentful meaning structure into two parts – the Gestalt of a binary construal as in Figure 3:

Figure 3. The antonymic dichotomy of a meaning structure

All antonymic contexts are created through a motivated mechanism of comparison. For instance, in expressing ‘this camera is *expensive*’, we establish an assessment based on a construal of comparison with a camera that would be regarded as ‘cheap’, in which case the two properties are aligned along the dimension of COST. Comparison, dimensional alignment and the formation of the Gestalt are all construal types that form part of LOC (Table 1). This demonstrates the usefulness of the three main components of LOC, i.e. content, configurations and construals. The difference between configurations (or schemas) and construals are not explicitly stated by other scholars in the working in the Cognitive framework (Langacker, 1987; Talmy, 2000; Croft & Cruse, 2004).

The configuration of BOUNDEDNESS constitutes an absolute and necessary requirement for meanings in a certain content segment to be used as antonyms. This is the schematic categorization of antonymy – the categorization by configuration. Antonymy by configuration is definitional and establishes the necessary and sufficient criteria for member inclusion. The category of antonymy, on this view, has no internal structure and is geared towards the boundaries for inclusion.

6. Conventionalization of antonym pairings

As has been shown through the various studies of antonyms reported on in this article and through examples from specific web searches, jokes and quotes by famous statesmen and literary authors, antonymy is pervasive in language and thought. In this section, our focus is on the pairings which seem to be antonyms *par excellence* in English as opposed to pairings that require more specific contextual and situational support. First of all, adjectival meanings occupy a prominent position as exponents of antonymy. Direct antonyms in the *Princeton WordNet* are considered to be hubs around which the adjective vocabulary revolves. In the light of antonyms *par excellence* there are clear similarities across the meanings of the antonyms that obtain high scores for co-occurrence in text both sententially and in specific constructions and in psycholinguistic experiments of different kinds as well as of the headwords for which antonyms are provided in *Collins Cobuild Advanced Learner's English Dictionary* (2003). The results from Paradis' & Willners' (2007) dictionary study give an indication of which items lexicographers consider to have conventionalized partners (see Section 2.1).

Among the adjectives with antonyms in *Collins Cobuild Advanced Learner's English Dictionary*, 95% denote gradable meanings, either scalar such as *big–small* or non-scalar such as *dead–alive*. The remaining 5% of the adjectives are non-gradables such as *abstract–concrete* and *female–male.*[13] What is evident from Paradis' & Willners' (2007) study is that what all adjectives with antonym partners in the dictionary have in common is that they denote single properties, such as SIZE, EXISTENCE, SPEED, LUMINOSITY, STRENGTH, WIDTH, MERIT, GENERALITY and GENDER, which allow them to be maximally similar on the contentful side of their meanings at the same time as they differ in signifying opposite aspects or two poles along the dimensions in question in their configuration.[14] For instance, *big* and *small* are both associated with the content domain of SIZE on a SCALE, and *dead* and *alive* are associated with EXISTENCE construed on either side of a BOUNDARY (Paradis, 2001; Paradis & Willners, 2006). The conceptual simplicity of the content expressed in combination with a configuration of SCALE or BOUNDARY invokes binary contrast and makes it a prominent mode of construal of comparison. It is not equally natural for most non-gradable adjectives to form pairs, since many of them are derived from nouns and thereby inherit more complex meaning structures (Paradis, 2004, 2005). For instance, it is not immediately obvious what would be the natural

[13] It is important to note that words do not 'have' set configurations in LOC, but are amenable to construals that fit the context at the moment of use as shown mainly by the elicitation experiment, where the participants construe their own contexts. This means that we may think of word meanings out of context as more or less biassed towards scalar, non–scalar or non–gradable use, but it is always possible to employ different configurations with one and the same contentful meaning structure (Paradis, 2008).

[14] The term property is defined as a region in a domain in conceptual space. Concepts, on the other hand, are regions based on several separable domains. In other words, properties are seen as special cases of concepts. They are independently defined and not only seen as parts of more complex concepts. (Gärdenfors, 2000, pp. 137, Paradis, 2005, p. 554).

antonyms for *financial, linguistic, pictorial* or *dental* from a semantic point of view?[15] *Abstract–concrete* and *female–male* are examples of non-gradables offered in the dictionary. Both pairs are emblematic of how people categorize phenomena in the world and/or how the nature of the world forces us to categorize things accordingly, which is intimately linked to the process of linguistic conventionalization.

Furthermore, we also show that considerably fewer nouns than adjectives are provided with antonyms in the dictionary. This is of course hardly surprising since many adjectives denote single properties, whereas many nouns signify complex meaning structures comprising many properties. The nominal meanings for which antonyms are offered represent both abstract and concrete notions. Almost two thirds denote abstract meanings and the rest denote concrete meanings. There are abstract pairs such as *victory–defeat, advantage–disadvantage, aggression–gentleness, pessimism–optimism, absence–presence* and concrete pairs such as *borrower–lender, buyer–seller, hero–villain, highbrow–lowbrow* and *dog–bitch.* Again, the majority of the antonymic nouns profile simple content structures, which are strongly associated with binarity, in the same way as most of the adjectives are. Abstract nominal meanings given antonym partners always profile simple content structures and the meanings of the concrete nominals profile particular conventionalized dimensions such as 'transfer of goods', 'personality', 'intelligence', 'status' and 'sex' and again, like for the adjectives above they mirror meaning segments that are natural and practical in people's worldly matters and doings (Paradis, 2005).

The majority of verb meanings with antonyms in the dictionary refer to bounded events, e.g. *accept–reject, agree–disagree,* and to scalar events such as *diminish–increase* and *criticize–praise* and a minority refer to scalar and bounded states, e.g. *hate/love, like/dislike* and *dread–look forward to.* The semantic patterns are again similar to the adjectival and nominal meanings described above in being conceptually simple with a natural tendency to bisect a domain or form opposite poles on a scale. The final 9% consists of temporal, directional and locative prepositions and adverbs such as *in–out, up–down, before–after.* They are all simple meaning structures. They are straightforwardly binary in the sense that the individual members of the pairs very saliently prompt an opposition.

With this picture of the semantic characteristics of conventionalized antonyms in language, Paradis et al. (2009) carried out the textual and experimental investigations described above. Since adjectives had been shown to be the types of form–meaning pairings most commonly associated with antonymy, they were the focus of attention The aim of the studies was to identify differences of goodness of antonymy. As has already been shown in Section 2, a very small number of adjectives were identified in the corpus study as strongly co-occurring in sentences along certain meaning dimensions: *good–bad, wide–narrow, dark–light, thin–thick, weak–strong* and *fast–slow*. The actual frequencies for these protagonists of each dimension were outstanding both individually and as co-occurring pairings, which is taken to be a sign of their being applicable in large range of meaning structures and useful in a large range of contexts individually and as pairs in which case the dimensional meaning structure is guaranteed. Another factor that seems to be of importance for the best pairings, judging from the experiment results, is the salience of the dimension. The dimensions, of which the conventionalized antonyms are representatives, are salient in the sense that they are easily identifiable. For instance, the SPEED dimension underlying *slow–fast* is easily

[15] A possibility would of course be lexicalizations with the prefix *non–*, which turns meanings into their opposites 'not being X', which like negation creates an antonym which often covers 'anything but X' and in that respect differs radically from explicit antonym partners along a certain dimension. However, the productivity of the *non–*prefix in word formation makes it less useful and less informative in dictionary entries. Also, and perhaps more importantly, we only rarely have a need for a lexical items that mean 'not financial' 'not linguistic', 'not pictorial' or 'not dental'.

identifiable, while the dimension behind say *rare–abundant, calm–disturbed, lean–fat* or *narrow–open* appear to have a more obscure application with respect to the shared contentful dimension. The results of the investigations also suggest that polysemy and multiple readings as such do not prevent a word from participating in a conventionalized couplings with another word, e.g. *light–dark* and *light–heavy* or *narrow–wide* and *narrow–open*. Contextual versatility is a reflection of ontological versatility, i.e. that the use potential of these antonyms applies in a wide range of contentful ontological domains and contrasting frames in text and discourse. Such antonymic pairs are also attracted by constructions of opposition.

Furthermore, it is well-established in the psycholinguistics literature that word frequency and semantic relatedness have facilitating effects in visual lexical decision performance. Frequent words are recognized at higher speed than infrequent words and so are targets preceded by related primes. In order to determine the relative importance between frequency of co-occurrence and semantic relatedness as such, i.e. the relation of antonymy, we set up a visual priming experiment (van de Weijer at al., submitted). The experiment confirmed previous priming experiments in showing that antonyms are facilitated by their primes, but frequency of co-occurrence in itself does not facilitate word recognition, either for frequently co-occurring antonyms or for frequently co-occurring unrelated adjectives. The prime-target effect which was obtained in the experiment is a semantic relatedness effect indicating that the conceptual opposition of antonymy is the *cause* of the lexical relation and not the *effect* of the frequency of co-occurrence of antonymic words. Importantly, the experiment thereby also provided support to our approach to antonymy as conceptual in nature in the first place, rather than primarily a lexical relation between word forms as in Structuralism.

It has been argued here that antonym canonicity and conventionalization of pairings in language are two sides of the same coin. Herrmann et al (1986, pp. 134–135) identify a continuum of goodness of antonym pairings on three indicators, which are relevant for the level of strength of linguistic conventionalization too. The first indicator concerns the clarity of the dimensions on which the pairs of antonyms are based – the clearer the relation, the better the antonym pairing. For instance, according to them the dimension on which *good–bad* is based is clearer than the dimension on which *holy–bad* relies. The clarity stems from the single component GOODNESS for the first pair as compared to the latter pair which they claim relies on at least two components, GOODNESS and MORAL CORRECTNESS. In other words, the clearer the dimension is the stronger the antonymic relation. Secondly, the dimension has to be predominantly denotative rather than predominantly connotative. The third element is concerned with the position of the word meaning on the dimensions. In order to be good antonyms the word pairs should occupy the opposite sides of the midpoint and the distances from the midpoint should be of equal magnitude, e.g. *hot–cold,* rather than placements on the same side as *cool–cold* (Ogden, 1932; Osgood et al., 1957).

The studies reviewed in this paper are consistent with the three indicators proposed to contribute to the strength of the coupling of antonyms and in consequence to their status as conventionalized pairings in language and memory. The observation that such pairings are all exponents of a salient basic dimension that is easily identifiable as an onomasiological type, i.e. MERIT, WIDTH, AGE, APERTURE, WEIGHT, TEMPERATURE (Langacker, 1987, p. 148; Lakoff, 1987, p. 271; Taylor, 2003, p. 88), and what we might call inherently binary because they profile simple content structures, i.e. dimensions or properties, and all of them are construed according to a SCALE or a BOUNDARY configuration. Some pairings appear to have status as conventionalized for most people and in many texts, while others are conventionalized by few people in very restricted contexts, such as *open–laparoscopic*. This means that contextual versatility often, but not necessarily, is a characteristic of ‘excellent’ antonyms.

7. Conclusion

Based on the results of a series of lexicological, textual and psycholinguistic investigations, this article is concerned with two fundamental semantic questions, namely (i) *What* are the categorial characteristics of antonymy in language? and (ii) *Why* are some pairings considered 'better' than others? In order to account for both these questions and for all kinds of antonyms ranging from conventionalized form–meaning pairings to construals of antonyms requiring substantial contextual motivation to make sense, a dynamic approach to meaning use and meaning making was employed, Lexical meaning as ontologies and construals (Paradis 2005). Two different types of category structures emerge from the study: categorization of antonymy by configuration (or schema) and by contentful meaning structures. These two types of categories are one another's complete opposites. The category of antonymy is geared to the boundaries of the category by virtue of the necessary and sufficient conditions for a pair to be antonyms. On this definition, antonyms are meanings that are used in binary opposition through a construal of comparison. Binarity is a bounded configuration in conceptual space, i.e. a phenomenological construct, which through dimensional alignment and comparison is used and understood as opposition. It has thereby been theoretically accommodated and explained within LOC. On this account all members have equal status as antonyms. Categorization by contentful structures, on the other hand, reveal that there is a continuum of very strongly associated word pairs at the one end and at the other end there are word meanings that have no strong lexico-semantic partners. The theoretical implications of the investigation are first and foremost that antonymy is basically a conceptual relation, but some particularly strong couplings indicate that some words may also have lexical correlates. This is a line of investigation that we will have to pursue in more detail. Characteristic of strongly coupled pairings typically get along with a very wide range of meanings and have no strong collocational preferences, they are frequent in language, both individually and in pairs and they profile properties where not more than two possibilities are given due to their configuration into two parts divided by a boundary or two poles of a single scale structure.

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Appendix A: Stimuli and responses in the elicitation experiment

Stimuli in bold followed by the responses for each stimulus ordered according to falling frequency. The stimuli are ordered according to rising number of responses. Omitted responses are not included.

bad good
beautiful ugly
clean dirty
heavy light
hot cold
poor rich
weak strong
young old
black white colour
fast slow fast
narrow wide broad
slow fast quick
soft hard rough
good bad evil
hard soft easy
open closed shut
big small little
easy hard difficult
white black dark
light dark heavy
dark light pale
large small little slim
rapid slow sluggish fast
small big large tall
ugly beautiful pretty attractive
exciting boring dull unexciting
thick thin clever fine
strong weak feeble mild slight
wide narrow thin skinny slim
evil good kind angelic pure
thin fat thick overweight wide
sober drunk frivolous inebriated intoxicated pissed
filthy clean spotless immaculate pristine sparkling
huge tiny small little minute petite
sick well healthy fine ill yum
enormous tiny miniscule small little minute slight
dull bright exciting interesting shiny lively sharp
bright dark dull dim gloomy stupid obscure
fat thin slim lean skinny thick wrong
rare common comonplace ubiquitous frequent plentiful well-known
feeble strong robust hard impressive powerful steadfast
broad narrow thin slim small lean slight
smooth rough bumpy hard jagged hairy resistent
healthy unhealthy sick ill lame diseased poorly sickly
tiny huge large big enormous massive giant gigantic
lean fat fatty flabby large plump support stocky wide
heroic cowardly unheroic scared wimpish villainous disappointing reticent weak
glad sad unhappy sorry upset disappointed regretful cross worried
bare covered clothed dressed abundant cluttered full loaded patterned
slim fat broad big chubby wide large obese plump round

tough weak tender easy soft flimsy gentle sensitive weedy wimpy
gradual immediate sudden rapid fast quickly instant abrupt incremental swift
tired awake energetic alert lively fresh wakeful energized peppy perky rested
sudden gradual slow prolonged expected incremental immediate delayed foreseen infrequent predictable
idle busy active energetic hard-working working awake conscious diligent industrious pro-active workaholic
gloomy bright happy cheerful cheery light sunny clear illumined nice merry pleasant
tender tough rough hard well-done cold robust chewy harsh mean nash strong uncaring
pale dark bright tanned bold brown coloured red ruddy colourful healthy rosey swarthy vivid
nervous calm confident bold brave relaxed alert assured excited fine innervous ready steady uncaring
limited unlimited extensive abundent comprehensive endless plenty available broad capacious common fat infinite widespread
robust weak fragile feeble flimsy shoddy thin brittle frail lethagic natural skinny slim vunerable
fine thick coarse bad bold dull wide blunt clumsy cloudy mad ok rough wet unwell
abundant scarce rare sparse little lacking disciplined few limited needed none meagre plentiful sparing threadbare
pure impure tainted contaminated corrupt dirty tarnished evil adulterated bad foul mixture sinful unclean unpure
immaculate untidy dirty messy filthy scruffy dishevelled boring faulty ramshacky spotted stained tarnished terrible tawdry
civil uncivil rude anarchic barbaric belligerent childish corperate couth horrible impolite mean nasty military savage unfair
extensive limited small intensive narrow restricted brief minimal constrained inextensive insufficient scanty short superficial sparse unextensive vague
grim nice happy bright cheerful pleasant positive hopeful good pleasant carefree clear cosy fun jolly reassuring welcoming
slender fat broad plump wide bulky chubby thick well-built big chunky curvy lean massive obese podgy portly rotund
delicate robust strong tough sturdy hardy rough coarse unbreakable bold bulky crude course gross hard hard-wearing harsh heavy
immediate later delayed slow gradual distant deferred extended anon eventually far forever longterm pending postponed prolonged soon whenever
modest boastful immodest arrogant bigheaded brash conceited extravagant vain outgoing blasé confident forward ignorant modest proud quiet shy
great small rubbish terrible bad average awful crap dreadful insignificant lowlyl mediocre microscopic obscure ok shit tiny poor unremarkable
firm soft weak floppy lenient wobbly flexible flimsy gentle groundless relenting lax limp loose saggy shaky undecided unsolid unstable
confused clear understood knowing sure lucid organised certain alert clued-up clearheaded coherent comprehending confident enlightened fine focused notconfused scatty together
bold timid shy cowardly faint fine italic thin nervous cautious faded feint frightened hairy meek quiet scared timorous weak yellow
daring cowardly timid nervous scared boring carefully cautious shy afraid careful fat faltering fearful reticient safe staid undaring wimpish
mediocre outstanding excellent exceptional brilliant amazing good great challenging charge clever extreme fair interesting mediocre rare special superb unusual wicked
yielding unyielding firm resisting dormant hard stubborn agressive dying fighting fixed lose losing obdurate rigid steadfast steamrollering strong stuck tough unproductive
irritated calm content relaxed amused fine placid serene soothed comfortable easy even good-humoured happy laid-back normal ok patient pleased tranquil unperturbed unruffled
alert sleepy tired asleep dozy oblivious distracted dull drowsy groggy lazy slow apathetic awake complacent dim dopey lethargic spacey torpid unaware unconscious unresponsive
disturbed calm undisturbed sane peaceful settled stable untouched alone balanced content fine ignored normal quiet relaxed together tranquil unaffected uninterrupted untroubled welcome well-adjusted well-balanced
slight large great strong big heavy considerable enormous huge major substantial very alot extensive heavyset lots marked massive plenty pronounced robust rough severe thick unslight well-built wide
delightful horrible awful unpleasant boring disgusting repulsive tedious abhorrent annoying crap difficult distasteful dredful dull grim hateful horrendous horrid irritating miserable nasty repellent revolting rubbish terrible uninteresting yuk
calm stressed stormy rough agitated excited hyper panicked angry annoyed anxious choppy crazy flustered frantic frenzied hectic hubbub hysterical irrate irrational jumpy lively loud nervous neurotic rage reckless tense troubled

Appendix B: The fourteen search frames in Jones et al (2007)

Wildcard-first frame	Wildcard-second frame	Functional type
* *and* Adj *alike*	Adj *and* * *alike*	COORDINATED
between * *and* Adj	*between* Adj *and* *	VARIOUS
both * *and* Adj	*both* Adj *and* *	COORDINATED
either * *or* Adj	*either* Adj *or* *	COORDINATED
from * *to* Adj	*from* Adj *to* *	TRANSITION/COORDINATED
* *versus* Adj	Adj *versus* *	CONFLICT
whether * *or* Adj	*whether* Adj *or* *	COORDINATED