1 Introduction

The notion of sense relations is linked with terms such as semantic relations, meaning relations and lexical relations, as well as paradigmatic/syntagmatic relations. The traditional field of sense relations was concerned with paradigmatic relations such as hyponymy, antonymy, synonymy, etc. Paradigmatic relations hold between lexical items which are thought to be intersubstitutable in a given position in a syntagm. In addition to the fine-grained classificatory accounts offered by Cruse (1986), a great number of traditional descriptions and historical guides on sense relations have been supplied in the past (cf. Lyons (2002); Cruse (2002a, 2002b); Lehrer (2002)). General descriptions of conventional classifications have prevailed, e.g. Cann (2011), although research on relations such as antonymy and synonymy has changed with the availability of new computational possibilities and experimental techniques, as well as the development of corpus-guided semantic models (e.g. Sinclair (1991); (Hoey 2005)) and cognitive theoretical frameworks (e.g. Croft and Cruse (2004); Paradis (2005)).

Corpus-guided approaches to meaning and particularly examinations of co-occurrences have provided a substantial contextual understanding of lexical behaviour (see Chapter 6). At the same time, the cognitive account has taken a comprehensive usage-based view of linguistic structures, leaving behind the division between lexis and grammar and focusing on the interplay between them as, for example, observed in constructions, and viewing meaning in terms of knowledge representation and conceptualisation (see Chapters 5 and 24). Overall, a more empirical and cognitive grounding to sense relations has emerged, offering new methodologies, evidence and hypotheses. It is within the latter context that this chapter will explore sense relations holding between words, concepts and/or constructions. This chapter will focus on recent developments within lexical semantics that have started to explore the most exemplified relations of contrast/opposition (antonymy) and identity/equivalence (synonymy), and will primarily examine the two phenomena by employing corpora and psycholinguistic experimental techniques with respect to English and German.

2 Historical perspective

Within the European context of linguistics in the twentieth century, the treatment of sense relations was long bound up with different traditions from Structuralist and post-Structuralist strands. Their approaches are generally regarded as the most influential in the study of
meaning and lexical paradigms. The Structuralist view was based on the assumption that lexical meaning is constituted by the relations lexemes hold with other lexemes in the same lexical-semantic paradigm. Structuralists argued that language is a unique autonomous self-contained and relational system, with clearly recognisable stable structures exposing inherent semantic properties of lexical items that can be decomposed and described (see Chapters 3 and 12). Sense relations are characteristic of a vocabulary that was considered to be an integrated relational system. Words have their positions within the lexical network and they exhibit primitive and universal principles of language structuring. Relations such as antonymy and synonymy were conceived as relations holding between lexemes or lexical units simply by virtue of their meaning or sense.

Studies by Lyons (1968, 1977), Lutzeier (1981), Lehrer and Lehrer (1982) and Bierwisch (1989) accomplished systematic examinations of lexical fields and developed definitions and classifications of paradigmatic relations which were deeply rooted in philosophical categories. Adopting a more contextualised approach, Cruse (1986) provided the most exhaustive taxonomy and a stringent terminology of sense relations. The use of the term “sense relation” suggests a commitment to Structuralist methodologies and the belief that language is structured in a stable relational system. Cruse and Togia (1995) advanced the treatment of sense relations from a traditional post-Structuralist perspective, bringing a cognitive aspect into their theory of meaning. The first attempt at shedding new light on the phenomenon of sense relations within a fully cognitive approach was made by Croft and Cruse (2004), who also made ample use of the keyword “sense relation” within this new theoretical framework. Sense relations were treated as “semantic relations not between words as such, but between particular contextual construals of words” (Croft and Cruse 2004: 141), which were considered to be flexible and dynamic. The ground for a more dynamic explanation of contextually flexible relations and a more compatible semantic model within lexical semantics was established, but without incorporating sufficient empirical evidence to substantiate this elaborate hypothesis.

Although corpus linguistics established empirical research in the study of meaning by examining linguistic structures and patterns in terms of syntagmatic lexical analysis, the subject of binary contrast/opposition and sameness of meaning was not initially a central aspect of the new methodological paradigm. A pioneering comprehensive corpus-based investigation of English antonymy was presented by Jones (2002), who proposed an empirically driven view encompassing structures of language use. Opposite pairs were re-examined by adopting corpus-linguistic methodologies such as statistically analysing patterns and studying examples of textual evidence. This work reopened the chapter on lexical-semantic relations of opposition/contrast, as well as semantic sameness/identity.

3 Critical issues

The Structuralist and post-Structuralist approaches provided neither a theory that accommodates flexibility in how lexico-semantic relations are used in actual discourse nor one based on a large amount of empirical evidence. Empirical research into lexico-semantic relations revolutionised the linguistic perspective on the dynamic nature and behaviour of antonymy and synonymy in discourse and presented copious evidence that meanings do not have a definitional structure with distinct boundaries. The data-driven investigation of text material has brought up new evidence and insights and pointed out the discrepancy between semantic models and textual structures. Today, a critical view is taken of traditional
classifications and the division between syntagmatic vs. paradigmatic structures, as well as the notion of lexical vs. conceptual relations.

3.1 Traditional categories

Classifying types of sense relation to describe the structure of a stable, integrated but dissectible linguistic system, and searching for a rigorous terminology, has been the endeavour and accomplishment of Lyons (1968), Cruse (1986) and Lutzeier (1981). These offered truth-conditionally definable sets fulfilling certain logical criteria of inclusion or exclusion for a detailed categorisation of sense relations. In this way, a comprehensive fine-grained system of sense relations was established and illustrated by introspective examples, which were at first decontextualised, and later more contextualised (Cruse 1986). The categories enabled linguists to group and identify lexical-semantic relations. For example, the relation of binary opposition (traditionally subsumed under the cover term antonymy) was divided into complementaries (e.g. dead-alive, hit-miss), gradable contraries/antonyms (e.g. long-short), reversives (e.g. fall-rise) and converses (e.g. buy-sell). We will characterise each in turn, before describing the relation of synonymy.

3.1.1 Oppositeness (antonymy)

Complementarity is a logical relation of binary contradiction. Non-gradable terms referring to two concepts are complementaries when they bisect a conceptual domain into two discrete, mutually exclusive sections. If \( X \) is not dead it necessarily follows that \( X \) is alive and vice versa. Hence, \( X \) is dead and \( X \) is alive cannot both be true at the same time.

Gradable antonymy is a relation of contrast where there is a range of values or degrees along the scale of the variable property (e.g. length, speed, weight). Gradable antonyms (or, simply, antonyms in the strict sense of the word) are terms, often adjectives, which express opposite parts of a scale denoting different degrees of this variable dimension. As a result, gradable antonyms are contraries but not contradictories (cf. Lyons (1977: 272)). \( X \) is long entails \( X \) is not short and vice versa, but the statement \( X \) is not long does not entail \( X \) is short, and similarly, \( X \) is not short does not entail \( X \) is long.

Reversives such as fall and rise or up and down are terms that denote movement or changes of a body in opposite directions along a potential path. The contrary directions are established by referring to specific reference points or points of orientation of a moving body. While one item refers to change from A to B, the other signifies change from B to A.

Converseness is a relation of logical equivalence and is restricted to elements with relational character (temporal or spatial) where two elements refer to different perspectives of one event. For pairs such as above-below, the relation can be expressed for two objects A and B in the following way: A is above B or B is below A. Converse relations are also common for terms referring to reciprocal social roles (e.g. parent-child, doctor-patient).

Problems of strict categorisation with regard to relations of opposition and exclusion have been identified by Philpotts (2001) for a number of English and German adjectives which were expected to demonstrate default antonymic readings. Philpotts examines a wide range of data and supplies ample evidence for different types of hybrid relations, such as the fact that in some contexts one member of the antonym pair showed that it is coercible to a complementary interpretation or vice versa. Similarly, Proost (2010), who investigates German verbs denoting speech acts in a decompositional fashion, encounters classification problems.
Her analysis provides evidence that some of the verbs in antonym pairs lack typical attributes associated with specific subtypes of opposite and do not fulfil the traditional truth-conditional tests (cf. Cruse (1986); Lyons (1995)) necessary to establish a relation of complementarity orgradable opposition. Discrepancies and limits of traditional categories of lexico-semantic relations also include pairs with a morphologically derived negated form such as German intelligent/unintelligent (“intelligent/unintelligent”), gefährlich/ungefährlich (“dangerous/undangerous”). These often cannot unanimously be classified as either (gradable) antonyms or non-gradable complementaries. The negated element ungefährlich does not indicate a degree of some property but an absolute state (compare the typical phrase absolut ungefährlich). It does not have inflectional comparative forms, and therefore appears to belong to the category of complementary opposites. In contrast, the unmarked item gefährlich refers to a gradable state as, for example, demonstrated by the pattern relativ gefährlich. It has inflectional comparative forms and can be coerced to an antonymic reading (cf. Cruse 2004: 164). While it has been assumed that negated forms are not readily gradable, such possibilities occur in actual language use as attested in corpora (Storjohann 2011) and through experimental techniques (Philpotts 2001).

Assessing the strength of antonym affinity is the focus of a study carried out by Paradis et al. (2009). Antonym affinity (also referred to as canonicity) reflects the degree to which antonyms are semantically related and conventionalised and hence entrenched as pairs in language and memory. Paradis et al.’s work is based on experimental methods and corpus-linguistic investigations where they show how opposites in use are judged differently by speakers ranging in their strength of affinity from salient to less salient opposition and are hence perceived as good (canonical) or bad (non-canonical). The classical system with its logical incompatibilities fails to define some of the less salient opposites and cannot account for this variability and flexible use of binary opposites in discourse. A definition was therefore needed that encompasses antonymy simultaneously as a lexical, semantic, conceptual and discourse phenomenon as well as antonymy in terms of logical incompatibility which involves similarity and differences.

3.1.2 Synonymy

Traditionally, synonymy has been formally divided into absolute/complete (e.g. sofa/settee in Cruse (1986: 269)), partial/propositional (e.g. fiddle/violin in Cruse (2004: 155)) as well as cognitive (e.g. infant/baby in Cruse (1986: 275)) categories, mainly depending on the degree of meaning difference in terms of expressive, stylistic or discursive traits or with regard to collocational preferences (cf. Cruse (1986: 273)), and depending on formal truth-conditional implications (cf. Lyons (1968: 450)). The typologies of synonyms reflect a continuum of meaning identity and vary in the literature (for a detailed overview see Adamska-Sałaciak (2013)). The central problem surrounds the key notion of presupposed properties exhibited by potentially synonymous pairs and formal-logical conditions regarding distributional identity and interchangeability. Smaller studies of English synonymy (Partington 1998; Murphy 2003), and of German synonymy (Storjohann 2009, 2010; Marková 2012) demonstrate how speakers adapt linguistic patterns to specific communicative needs in actual language use. Synonyms too vary in language use as identified for different degrees of synonymy, irrespective of their alleged type or degree of sameness of meaning. The evidence suggests that semantic equivalence is contextually construed, as shown in example (1) between sauber/rein (“clean/immaculate”) or modified by neutralising possible semantic differences which are, alternatively, emphasised in example (2).
Meaning identity is an emergent construal marked by concrete forms of linguistic realisations and exemplifying cognitive mechanisms as well as using specific knowledge for particular comparative or inclusive purposes. As illustrated in 4.1.2, the relation of synonymy is dynamic and a product of different types of cognitive equivalence (cf. Adamska-Sałaciak (2013)).

### 3.2 Syntagmatic vs. paradigmatic relations

Semanticists have traditionally referred to lexico-semantic relations in terms of paradigmatic vs. syntagmatic structures, implying strict distinctions between them. Sense relations and hence primarily paradigmatic relations such as synonymy, antonymy, hyponymy, meronymy etc. were perceived to be related words that constitute a set of potentially substitutable expressions within the same lexical paradigm. A paradigmatic approach to sense relations implies focusing on the semantic properties that define such paradigmatic sets (or sometimes entire lexical fields). A syntagmatic approach, on the other hand, is concerned with lexical items surrounding the lexeme in question in terms of collocation and co-occurrence to describe the meaning of a word in a specific context (cf. Lyons (2002)). Cognitive and corpus-linguistic models have revealed the advantage of focusing on situations where items from the same paradigm co-occur in a single syntagm, adopting a critical perspective on the treatment of antonymy, in particular, as a paradigmatic opposition. Studies of English antonymy (cf. Justeson and Katz (1991); Mettinger (1994); Fellbaum (1995); Jones (2002)) and Swedish (Willners (2001)) as well as Japanese antonyms (Muehleisen and Isono (2009)) have established the view that antonymy is realised in co-text through specific contextual syntagmatic frames. Empirical evidence has also been put forward to support the view that antonym items occur in the same lexico-grammatical environment based on regular intrasential co-occurrence more often than chance would allow (see details in 4.1.1).

### 4 Current methodologies, approaches and accounts

Investigations of sense relations are currently carried out through the use of computationally enabled corpus procedures, on the one hand, and different psycholinguistic techniques, on the other. Both have contributed profitably to insights into the nature of paradigmatics by implying a usage-based view of language structures. Conclusions are based on mass data which account for the recurrence, variability and distribution of patterns. The linguistic objectives have changed too and researchers from different linguistic schools and approaches share an interest in contextualised, dynamically construed meaning and in the grounding of language use in cognitive and social-interactional processes. A number of linguists, mostly in English and Swedish linguistics and with a particular interest in the subject of antonymy, have reopened the chapter on lexico-semantic relations, offering new perspectives, employing new methodologies and using empirical evidence (cf. Philpotts (2001); Willners (2001);
Jones (2002); Murphy (2003, 2006); Murphy et al. (2009); Paradis et al. (2009)). Their ideas have inspired other linguists with the same interest in antonymy (e.g. Muehleisen and Isono (2009)) and they have also been adopted by semanticists with an interest in the subject of German synonymy (e.g. Storjohann (2010); Marková (2012)).

4.1 The corpus-linguistic account

In the tradition of British Contextualism, the Firthian hypothesis “You shall know the meaning of a word by the company it keeps” (Firth 1957: 179) was central to lexical studies of meaning. Consequently, it is studies on the English language in particular that have succeeded in advancing theories about lexico-semantic relations.

4.1.1 Contrast and opposition: antonym

Employing a larger corpus and statistical procedures, Jones (2002) investigates sententially co-occurring pairs expressing opposition. He identifies different lexico-grammatical frames that contextually embed antonym pairs and he demonstrates how these behave distributionally over a corpus. Jones’s work (2002) is based on a 280-million-word corpus of written English (later also applied to spoken English, cf. Jones (2002)), and it offers the first systematic and comprehensive analysis of the discourse functions and distributional behaviour of antonyms. The claim that antonymy is linguistically realised in regular phrasal templates as co-occurring pairs in a greater than chance fashion is supported by the large amount of empirical evidence he presents. He also argues that antonyms accomplish various discourse functions, both in written text and in speech. These discourse functions typify antonym pairs according to their immediate grammatical context within a regular syntagm and are not based on logical formal truth-conditional principles. The most frequent discourse functions (examples from Jones (2002) and Jones et al. (2012)) are:

Coordinated Antonymy (X and/or Y, both X and Y, (n)either X nor Y, either Y or X, X and Y alike, X as well as Y):

\[
\text{It would be good to hear all experiences, good as well as bad.}
\]
\[
\text{Like all of us, athletes need to find a way of rationalising both failure and success.}
\]

Ancillary Antonymy (sentential two-pair contrast between X/Y and A/B):

\[
\text{However, it is the scale of Labour success, not of Conservative failure, that stands out.}
\]
\[
\text{The teacher is active and the student is passive.}
\]

Comparative Antonymy (more X than Y, X is more than Y, X rather than Y, X as . . . as Y):

\[
\text{In every part of the country, more people think badly of him than think well.}
\]
\[
\text{It is temporary, I would say it’s more temporary than permanent.}
\]

Negated Antonymy (X not Y, X instead of Y, X as opposed to Y):

\[
\text{Sponsors want to invest in success, not failure.}
\]
\[
\text{That’s not making it clean, that’s making it dirty.}
\]
Distinguished Antonymy (between X and Y, separating X and Y, X differ from Y):

To them, \[. . . \], the distinction between fact and fiction or good and bad is not always so obvious.
But then, crowds do not discriminate any too nicely between guilt and innocence.

Transitional Antonymy (from X to Y, turning X into Y, X gives way to Y):

How easy to slip from the legal to the illegal trade, especially when the law is so patchy and the temptation so great.
But it’s been strangely quiet in Twickenham over the last week or two, and I must say my optimism is turning to pessimism.

These frames exhibit specific lexico-syntactic properties but are not necessarily unique to antonymy. Language users may contextually construe a contrast using such templates even in cases in which two incompatible items do not normally express a semantic contrast in nature. The semantic distinction is neutralised, for example, in conjoined patterns such as X and Y alike. In this way, specific discourse functions are semantically attributed to each individual phrasal template. As these frames are associated with meaningful components, they could be interpreted as constructions in the sense of Construction Grammar (see details in 4.3).

4.1.2 Semantic similarity/equivalence: synonymy

Corpus-assisted research into synonymy is characterised by two strands: investigating semantic differences in near-synonyms on the one hand, and observing constructional aspects and identifying conceptual processes in the construal of meaning identity in context, on the other. Computational methodologies, such as the statistical analysis of collocations, help linguists to examine fine-grained differences in textual co-occurrences and selectional restrictions between near-synonyms. This has been successfully demonstrated by Partington (1998), by looking at collocations of sheer/pure/complete/absolute, by Taylor (2003), who looks at tall/high and by Moon (2013), who investigates brave/courageous in English. For German, Marková (2012) reviews corpus evidence for kalt/kühl (“cold/cool”) and schön/hübisch (“beautiful/pretty”). Such studies aim to analyse near-synonyms by measuring the degree of collocational overlap to identify the precise circumstances in which a lexical item can be substituted by a semantically similar item.

The discussion of meaning identity has also moved on to a debate where synonymy is viewed as a conceptual relation. Corpus data helps to identify linguistic structures which illuminate how similarity of concepts is conventionally encoded and externalised. In the case of German synonymy, Storjohann (2006, 2010) shows that a number of synonyms also frequently combine in close proximity and recur in combinational sequences. In analogy to Jones’s (2002) description of antonyms, they can partly be classified according to their lexico-syntactic behaviour reflecting discourse-functional categories. These are:

Coordinated Synonymy (X and Y, X or Y, X as well as Y, X and Y alike):

Der Streit im Abgeordnetenhaus um die Auflösung der Westberliner Akademie der Wissenschaften \[. . . \] müßte “von unabhängigen und neutralen Gerichten” entschieden werden, erklärte die ASJ gestern. (DeReKo: “The debate in the
parliament on closing the research academy in West Berlin [...] must be decided ‘by independent and neutral courts’.

Synonym Clusters (X, Y, Z; X and Y and Z as well):

Das Volk der Deutschen muss beweglicher, flexibler, agiler werden, verlangt sein grosser Häuptling in Bonn, der trotz seiner Leibesfülle erstaunlich leichtfüßig geht. (DeReKo: “Germans should become more mobile, flexible and agile, demands the big chief in Bonn.”)

Die neutrale, freie, unabhängige Schweiz passt nicht in die neue Weltordnung. Denn das Ziel der UNO ist: Globalisierung auf allen Ebenen - Zentralismus. (DeReKo) (“A neutral, free and independent Switzerland does not fit into the new world order.”)

Subordinated Synonymy (X, which means Y; X, meaning Y; X, which is Y):

In der ersten schnellen Runde baut sich bei uns eine um etwa zehn Grad kühlere Temperatur auf. Ist sie dann im grünen Bereich, dann ist der Reifen aber schon so abgefahren, daß nicht mehr der optimale, sprich bestmögliche, Haftwert erreicht wird. (DeReKo: “If the temperature is about right, the tyre is already so worn that the optimal, that is the best possible, adhesion can no longer be achieved.”)

Corpus data indicates that synonym pairs favour a coordinated phrasal template in everyday language. A conjoined framework is an economical way of conveying as much information as possible, including slight semantic shades of difference between the synonyms. By using such frames, language users who produce repetition signal semantic inclusion as well as exhaustiveness and try to express a specific concept exhaustively by employing variation of expression, thus communicating slightly different pragmatic information. Another effect of such patterning might be that the synonyms involved become more alike as each contaminates the other’s semantic interpretation, although this depends on how conventionalised the conjoined pairing is. Speakers characteristically employ subordinating structures where an explanation or clarification is made explicit, as is often the case in technical language use.

Storjohann (2010) investigates larger contexts where German synonyms (e.g. Gefahr - Risiko “danger-risk”) co-occur within a span of two sentences. Typically, these exemplify sameness of meaning concerning the terms in question (see German example (3), and similarly, English example (4)).

(3) Die Gefahr, in unmittelbarer Nähe des Atommeilers Krümmel bei Geesthacht an Leukämie zu erkranken, ist für Erwachsene noch höher, als in einer Studie bisher bekanntgeworden war. Die neue Studie über das Risiko für Erwachsene, in der Nähe des Atomkraftwerkes Krümmel bei Geesthacht an Leukämie zu erkranken, enthält mehr Brisanz als bisher angenommen. (DeReKo: “The danger of developing leukemia in the immediate surroundings of the nuclear reactor ‘Krümmel’ near Geesthacht is even higher for adults than previously stated in a study. A new study on the risk of developing leukemia in the neighbourhood of the nuclear power plant ‘Krümmel’ near Geesthacht contains more explosive information than had been assumed.”)

(4) The deputy governor of the Bank of England warned yesterday that the financial crisis could wreak further damage and that there were dangers in rushing to
overhaul regulation. [... ] “There is a risk that we have run ahead of ourselves in deciding how we got here and what we should do about it,” Mr Tucker added. (The Independent, 28 March 2009, p. 52)

Besides attestations of contexts where both synonyms can be substituted within specific constraints, corpus data reveals relations between the items where specific types of conceptual entailment or inclusion are indicated through the use of lexico-grammatical patterns. This is particularly the case for synonyms in close proximity. For example, as indicated by the frames X implies Y, X because of Y, X otherwise Y (alternatively X also means Y, X is nothing but Y, X simultaneously/always means Y, X includes Y) in sentences (5)–(7), a relation of semantic (causal) implication is expressed by the templates in which Risiko (“risk”) and Gefahr (“danger”) occur.

(5) *Wer von ‘Risiko’ spricht, impliziert Gefahr.* (DeReKo: “Those who speak of ‘risk’ imply ‘danger’.“)

(6) “*Hunde sind weniger ein Problem,* sagt Stefanie Gomez, “*aber Katzen gelten wegen der Gefahr einer Toxoplasmoseübertragung als Risiko.*” (DeReKo: “Dogs are less of a problem,” Stefanie Gomez says, “but cats are considered more of a risk because of the danger of transmitting toxoplasmosis.”)

(7) “*Ich werde kein zu großes Risiko eingehen, sonst besteht die Gefahr, dass wir uns für mehrere Wochen schwächen,*” sagt Stephan Krautkremer. (DeReKo: “I will not take too big a risk, as otherwise there is danger that we will be weakened for weeks,” Stephan Krautkremer says.)

In other cases, two synonyms lexicalise concepts as mutually dependent or semantically implied/associated in the following way: cause-effect (*X because of Y*), conditional relations (*if X then Y*), relations focusing a purpose-goal orientation (*X in order to Y*), part-of-whole relations (*X as part of Y*) and semantic entailment by superordination (hyperonymy, see section 5). All of these semantic relations illustrate semantic closeness on the basis of different conceptual properties which might be perceived as similar enough to construe sameness of meaning. Consequently, a relation of synonymy can be construed because the lexical items involved are semantically firmly included, associated with or entrenched in each other to appear similar enough to be used as meaning equivalents in specific contexts. This knowledge is shared by speakers.

Croft and Cruse claim that intuitively, speakers operate with a complex notion of synonymy, with different conceptions for different purposes, which are dependent on prototypical situations and on “contingent facts about the world” (2004: 165). This flexibility accounts for synonymy being a conceptual relation, as the knowledge represented by such contexts is stored in the mental lexicon and used to create sameness of meaning when communicatively necessary as the relation of cause-effect or conditionality is taken for implicit conceptual knowledge or as a “contingent fact about the world”. As Murphy (2003: 168) points out, “what actually counts as synonymous is constrained by the demands of communicative language use and the context in which this language use occurs”. It is the level of specificity of relevant properties that affects how similar the meanings of two words seem (cf. Murphy (2003: 139)). Knowledge of semantic closeness and semantic specificity is available to speakers in situations of use. The stronger the association of one concept with the other becomes, the more likely that a synonymous relation can exist between their lexicalisations, but with the restriction that “construability is not infinitely flexible” (Croft and Cruse 2004: 144). A traditional classification of synonymy cannot sufficiently cover necessary context-sensitive properties. A rather broad pragmatic view of synonymy, as proposed by Murphy (2003: 150),
better reflects the linguistic construal of contextual meaning identity. She suggests that two lexical items are taken to be synonyms, “as long as their differences are slight enough that, in context, the two words’ meanings contribute the same context-relevant information”.

### 4.2 Psycholinguistic methods in the study of antonymy

The subject of antonym canonicity (affinity) has been addressed using psycholinguistic and corpus methods. Antonym canonicity expresses the degree of conventionalisation in language and the extent of entrenchment in the minds of speakers (Murphy 2003). Questions of canonicity are concerned with the degree of strength of lexico-semantic pairings and why some pairs are strongly associatively connected and hence considered better opposites than others. The use of judgement experiments, elicitation tests, priming experiments and word recognition tasks as ways of assessing the degree of canonicity has been central to the work of Paradis et al. (2009) for English, and Willners and Paradis (2010) for Swedish. Their underlying hypothesis was that people judge pairs as either non-antonymous, somewhat antonymous or as good antonyms. A point of departure for judgement and elicitation tests was the assumption that well-known antonyms co-occur contextually significantly more often than antonyms that are less conventionalised in language use. The aim of the study was to find out if antonym pairs with the highest significance of co-occurrence are also judged and identified as the most conventionalised. Their findings have contributed to the development of a theoretical cognitive framework (see 4.4).

First, the experiments demonstrated that there is a strong correlation between antonym frequency and co-occurrence in a corpus and the degree of canonicity of antonym pairs. High-scoring antonym pairs from psycholinguistic test sets are the same as those that occurred most frequently in the British National Corpus, as single lexical items and as co-occurring pairs. Standard deviation is low for antonyms that were classified as canonical a priori and higher for non-canonical pairs. Speakers largely agree on canonical antonyms. The list of elicited antonyms suggests a scale of canonicity, exhibiting an established antonym canon and ranging from good matches to test items with no clearly preferred partners. Second, there is no significant difference relating to the preference of ordering antonyms or the influence on the judgement of goodness-of-antonymy. Third, the results of the tests point towards canonicity being a gradable property existing along a scale in the sense of a continuum of goodness-of-antonymy. Participants in the elicitation tests were asked to give the best possible opposite for a number of stimulus words, as single words without context. The elicitation experiment showed that a number of antonym seed words favoured only one response antonym word (e.g. good-bad, narrow-wide, rapid-slow), while others had a varying number of different antonym counterparts (e.g. stimulus adjectives such as delicate-robust/strong/tough). More frequent and salient adjectives, for example, elicit fewer different adjectival antonyms than less frequent adjectives do. Overall, findings from judgement and elicitation experiments support the view that antonyms should be treated as a conceptual relation instead of being defined as a lexical-categorial relation.

### 4.3 The constructionist account

Murphy (2006) proposes treating canonical antonym pairings as constructions in the sense of Construction Grammar (cf. Goldberg (1995); Fillmore and Kay (1995); see Chapter 24). A canonical antonym pair is a “complex lexical construction consisting of two lexical items ready for insertion into constructions that require two items of the same part of speech”
Certain specific characteristics of Construction Grammar allow for the treatment of antonym relations as lexical components of grammatical and textual patterns. Construction Grammar posits that constructions are basic linguistic units in terms of form-meaning pairings which make little distinction between their lexical and syntactic constituents. This position is particularly compatible with the view that a relation such as antonymy is realised in syntagmatic structures which constitute a lexical-grammatical pattern which frames antonymous items repeatedly. These templates are more than just a two-member semantic structure. They are syntagmatic forms with specific discourse functions (cf. Jones (2002)) and they have meaningful associations and can thus be interpreted as form-meaning pairs which become linguistically realised in discourse as constructs. For example, in sequences such as X and Y, or X and Y alike with antonyms hot and cold as X and Y, an exhaustiveness of a gradable property is indicated and both ends of the two opposite states of a scale as well as all states in between the poles are implied at the same time. Part of the meaning of constructions such as X and Y alike is “that it unites and neutralizes contrasting categories, and thus any two words that appear in this construction are interpreted as opposites” (Jones et al. 2012: 107).

Construction Grammar does not rely on a context-free phrase structure grammar and does not separate individual constituents. The view is shared that constructs can interact within larger constructs and unify with each other. Word pairs in a relation of antonymy are treated as “discontinuous lexical items that are compatible with unifiable slots in other constructions” (Jones et al. 2012: 126). Construction Grammar allows for considerations of structures at most linguistic levels, from the morphological to the textual level. That means antonym constructs can appear outside the specific boundaries of particular constituents. This fact is well suited to explain why antonyms can co-occur in constructions such as hot and cold as well as in frames such as from hot to cold. Antonym constructs and their underlying lexico-grammatical constructions are referred to as contrastive constructions (Jones et al. 2012: 108).

Although there are fewer attestations that synonyms constitute specific lexical form-meaning pairings, smaller corpus studies have demonstrated that a number of meaning equivalents occur in regular sentential patterns (e.g. in coordinated phrasal templates) in a higher-than-chance frequency too (cf. Gries and Otani (2010)). Synonym pairings which are observed to co-occur in specific discourse frames can thus also be treated as constructions. Part of their constructional meaning is that it semantically unites and signals semantic inclusiveness and exhaustiveness. Synonym constructs and their underlying lexico-grammatical constructions could be labelled as inclusive/implying constructions. Overall, the argument for acknowledging highly conventionalised antonyms or synonyms as a constructional phenomenon is based on their grammatical and lexical characteristics as well as on their high degree of conventionalisation.

4.4 The dynamic construal account

An elaborate theoretical explanation of the nature of sense relations concerns opposites (cf. Jones et al. 2012), where all kinds of antonym relations from highly conventionalised lexico-semantic couplings to strongly contextually motivated pairings are accommodated by the cognitive construal approach (Croft and Cruse 2004). Sense relations are treated as semantic relations between “particular contextual construals of words” (Croft and Cruse 2004: 141). This model seeks to explain how antonymy is construed and why some pairs are “better” than others (Paradis 2010). The implication of this treatment of antonymy is
that this lexico-semantic relation is primarily conceptual in nature and that it is dynamically construed. So far, the construal account offers a theoretical explanation of all semantic and pragmatic mechanisms that are involved when language users express contrast/opposition. Paradis (2001, 2005) extends the cognitive model by incorporating results from empirical psycholinguistic and corpus-guided studies of antonyms which employ usage-based methodologies. She puts forward an integrated descriptive usage-based proposal of antonymy as a conceptual relation and a construal, adopting a perspective referred to as Lexical Meaning as Ontologies and Construals (LOC). It provides a way of investigating how antonymy can be construed in any pair of lexical items in terms of the configuration of specific semantic content, and exactly why some pairs are perceived to be “better” antonyms than others. For example, *good-bad, strong-weak, rich-poor* are highly conventionalised and hence canonical antonyms, as these are adjectives with meanings referring to properties of salient dimensions of high generality. As Jones et al. (2012: 139–140) point out, meanings that lend themselves to conventionalise binary opposition typically profile properties where not more than two possibilities are given. The two possibilities are properties within a simple conceptual dimension that is configured as two parts divided by a boundary or two poles of a single scale structure.

On the other hand, a number of different antonyms are suggested for *calm*, e.g. *stressed, stormy, rough, excited* etc. (examples from Jones et al. 2012: 140). As *calm* does not refer to a single property or a straightforward meaning structure (antonym schema) in a canonical way, different ontological meanings are described. Antonyms do not rely on inherent salient properties but are contextualised through their collocational profiles. The creation of antonymy is a result of construal processing operating with basic ontological categories (also called configurations) such as SCALE, DEGREE, BOUNDEDNESS, comprising semantic components and properties for example LENGTH (e.g. *long-short*), SIZE (e.g. *big-small*), MERIT (e.g. *good-bad*) or GENDER (e.g. *male-female*) etc. This means that opposition used in context implies “cognitive processes that operate on ontological structures when we use language to create meaning” (Jones et al. 2012: 130).

According to the construal account, antonymy is defined as a construal of binary contrast which in effect is a construal of comparison, grounded in perceptual and cognitive processing. Binarity is a schema in conceptual space (e.g. DEGREE/SCALE). The two opposing sides of the domain are divided by a boundary, looking at antonymy with a specific categorial focus. The prerequisites for constituting antonym use are a combination of configuring the boundary of a domain category and using cognitive processes (construals) such as contextual focusing, comparison of the two sides and profiling of a specific dimension. Thereby, specific content is categorised into two antonymic parts and contrasted irrespective of the salience of these parts. The strength of antonymous affinity or method of configuration and thus its salience largely depend on the complexity of the basic conceptual content structures as SCALE or BOUNDEDNESS.

Compared to Structuralist definitions, today, a broad, more pragmatic definition of antonymy is suggested by Jones et al. (2012). It brings together insights from corpus and psycholinguistic studies and applies to all types of opposites referring to “a pair-wise relation of lexical items in context that are understood to be semantically opposite” (2012: 2). This means that antonymy is broadly understood as form-meaning pairings that are used in binary opposition in language use. Words have different antonyms in different contexts depending on which of the item’s semantic properties are relevant to contrast within a specific use.
Data-driven research on German synonymy shows indicative evidence that this sense relation can be treated sufficiently within the dynamic contextual construal theory too (Marková 2012). Presumably, similar categorisation principles, configuration and construal processes such as COMPARISON play a vital role in the negotiation of sameness of meaning in language use. However, further evidence from different complementary methodologies is needed to draw convincing theoretical conclusions.

5 Hyponymy, incompatibility and meronymy

Within the traditional paradigmatic viewpoint, sense relations such as hyponymy, meronymy and incompatibility have been described in terms of truth-conditional relations between words or alternatively between meanings/senses. Within a cognitive account, hyponymy (relation of inclusion e.g. between apple and fruit), partonomy, also referred to as meronymy, (relation of part-whole, e.g. finger-hand) and incompatibility (the relation of exclusion between co-hyponyms, e.g. dog-cat-mouse) are treated as semantic relations between particular contextual construals of words with specific boundaries and constraints.

5.1 Hyponymy

Hyponymy is regarded as simple class inclusion and unilateral entailment and is “one of the most important structuring relations in the vocabulary of a language” (Cruse 2004: 148). The meaning of It’s an apple entails but is not conversely entailed by the meaning of the expression It’s a fruit. Classical definitions refer to fruit as the hyperonym representing a superordinate concept in a branching taxonomic system. A hyponym (apple), on the other hand, is a specific type or representative of the overall class of fruits. As long as prototypical notions are related to each other, default interpretations are triggered which generally follow the necessary truth-conditions of inclusion. However, a number of problems of defining hyponymy as a truth-conditional and logically transitive relation of entailment have been pointed out. These concern cases which fail the test of logical transitivity, as soon as non-prototypical hyponyms are assigned as types of commonly known superordinates (see example taken from Cruse (2004: 149)).

(8) A car seat is a type of seat.
   A seat is a type of furniture.
   *A car seat is a type of furniture.

Similarly difficult are the relations between dog-animal and dog-pet. It’s a dog entails It’s an animal and this indicates that dog is a hyponym of animal. Apart from this first test frame for entailment, normality in a second diagnostic frame X and other Ys, as in dogs and other animals, further supports a hyponym relation between dog and animal. However, the expression dogs and other pets is also perfectly possible while in most people’s judgement It’s a dog does not necessarily entail It’s a pet. Is pet therefore a superordinate of dog or is it not? The relation between dog and animal might more easily be accepted as hyponymy because dog might be a prototypical hyponym of the more prototypical hyperonym animal. However, in actual language use, speakers intuitively construe contexts where hyponymous items are connected which are not prototypical (such as between dogs and pets) and where specific domains instead of default readings are triggered. The cognitive strand allows pairs of lexical items related by hyponymy to be treated as dynamic relations. It accounts for hyponym
variation and for hyponymy as a context-bound relation whereby the construability of contextual boundaries and variation of boundary placement affects the interpretation of hyponym pairs. Dogs and pets, just like dogs and animals, can be considered as related by hyponymy where construed meanings have been adjusted to specify a proper subclass of animals and where a specific domain and different semantic boundaries or domains have been established.

5.2 Incompatibility

If a superordinate/hyperonym such as animal has more than one hyponym (e.g. dog, cat, mouse etc.), these are linked as incompatibles (co-hyponyms). Incompatibility (co-hyponymy) exists between members of sets of the same hierarchical level and therefore holds between items referring to the same semantic field or domain. They form sets of terms denoting specific kinds of their common superordinate. These sets designate disjunct classes between which no member is shared. No two terms of different sets can be used simultaneously without implying contradiction. If something is a dog, it is implied that it is not a cat or a mouse and vice versa. Co-hyponymy, like hyponymy, has been of interest to semanticists for the description of the structure of the vocabulary. However, incompatibility does not simply signify a difference of meaning. As repeatedly pointed out by Cruse, this sense relation is “an important and rather special one” (Cruse 2004: 162). A corpus-assisted re-evaluation of the phenomenon of incompatibility with respect to German co-hyponyms and their functions in text and discourse has been propounded in Storjohann (2007). It has been argued that the relation in question can function as a discourse marker provided the incompatibles of a lexical item such as Globalisierung (“globalisation”) refer to a socially and politically controversial notion. Incompatibles occur in close contextual proximity and participate in regular syntagmatic frames (e.g. conjoined patterns such as Globalisierung und Deregulierung “globalisation and deregulation” or Globalisierung und Kapitalismus “globalisation and capitalism”). The various incompatibles of Globalisierung show crucial evidence for thematic diversity within a specific (critical) discourse. They focus on discursive aspects and illustrate a spectrum of semantic nuances. Therefore, it is claimed that they exhibit a pragmatic-discursive force and that they reveal a sense-constructing function, as they contribute to facets of contextual meaning.

a Incompatibles denoting global economic states or developments: Deregulierung (“deregulation”), Flexibilisierung (“flexibilisation”), Freihandel (“free trade”), Privatisierung (“privatisation”) . . .
b Incompatibles denoting socio-political effects and characteristics of globalised societies and their political actions: Arbeitslosigkeit (“unemployment”), Demokratie (“democracy”), Gerechtigkeit (“justice”), Migration (“migration”), Neoliberalismus (“neoliberalism”) . . .
c Incompatibles denoting communication and technology: Computerisierung (“computerisation”), Digitalisierung (“digitalisation”), Informationsrevolution (“information revolution”), Kommunikation (“communication”) . . .

5.3 Partonymy/meronomy

Partonymy/meronomy is a part-whole/portion-whole relation applying to two individual entities that are linked to illustrate the notion of containment (e.g. finger-hand). Following the cognitive framework as suggested by Croft and Cruse (2004), meronymy is defined as follows:
If A is a meronym of B in a particular context, then any member a of the extension of A maps onto a specific member b of the extension of B of which it is construed as a part, or it potentially stands in an intrinsically construed relation of part to some actual or potential member of B.

(Croft and Cruse 2004: 160)

Finger is an intrinsic part of a hand, not just an attachment, whereas lake can be imposed as a part of a park but it is not a necessary part of it. Cruse (1986) and Croft and Cruse (2004) have provided a detailed account of the category PART including classes such as part, portion, piece, segment and element, which can be judged differently by speakers as parts of a whole. As Croft and Cruse (2004: 155–156) point out, as an example, how speakers’ judgements differ as to whether a battery and a bulb are equally parts of a flashlight, although both are contained in the body of it. Conventionally, the bulb is included whereas a battery is not part of a flashlight as it is expected to be bought separately. A clear definition of meronymy is difficult, as it remains open where the boundaries of a whole entity are.

6 Future directions

Evidence has been put forward to establish that semantic classifications based on formal or logical principles are not always compatible with data emerging from corpus-driven or psycholinguistic studies. Sense relations as contextually construed in discourse are flexible and dynamic and can often not be assigned to rigid logical formulas. The study of opposition in particular provides a solid basis for the development of a larger semantic theory, not by illuminating features of meaning, but by looking at dynamic contextual behaviour, discourse functions and linguistic realisation as patterns in language use, and by examining constructions for hints of underlying cognitive mechanisms.

While a number of linguistic issues have been revisited recently, some research questions remain unexplored or deserve further exploration, since some aspects of the nature of sense relations remain unknown. These mainly concern the ways in which lexico-semantic relations are conventionalised, stored and exploited. First, a number of specific questions address issues of negation as well as differences between affixal and non-negated antonymous adjectives; for example, why the lexical item natural co-occurs significantly with opposites such as artificial and man-made but not with its morphologically derived form unnatural. Similar evidence is found for German normal (“normal”) which co-occurs with krankhaft (“morbid”) and verrückt (“crazy”), but far less frequently with its derivates unnormal/abnormal. Second, another interesting aspect of antonymy is that co-occurring antonyms tend to show a specific preference in their order of sequence in constructions (long > short, good > bad rather than short > long, bad > good). Exhaustive research is needed with regard to the ordering and symmetry of antonyms. Third, another central question is whether the collocation profile of antonym items and the degree to which pairs modify the same nominal meanings affect their degree of antonym affinity. Finally, the subject of hyponymy, incompatibility and meronymy deserve greater attention from a variety of angles. This also implies examinations of relational constructions in various genres and, more importantly, in spoken language. Only then can the phenomena of hyponymy, incompatibility and meronymy be accounted for satisfactorily in contemporary theories. To answer some of the open questions, cross-linguistic investigations contributing to the understanding of lexical typology can also provide valuable insights. With the further development of computational techniques capable of linguistically more precise and more comprehensive data searches, further findings should be expected.
Further reading

Croft, W. and D. A. Cruse 2004. *Cognitive Linguistics*. Cambridge: Cambridge University Press. In section 6 and 7 a cognitive account of sense relations is propounded and hyponymy and relations of contrast are discussed as dynamic, context-sensitive construals.


Jones, St., L. M. Murphy, C. Paradis and C. Willners 2012. *Antonyms in English. Construals, Construction and Canonicity*. Studies in English Language. Cambridge: Cambridge University Press. Provides an extensive investigation of English antonyms and offers an innovative model of how we mentally organise concepts and how we perceive contrast between them.

Paradis, C. 2005. Ontologies and construal in lexical semantics. *Axiomathes* 15: 541–573. Proposes a usage-based model of lexical meaning in terms of properties of ontologies in conceptual space. This theory is the basis of a new antonymy model (see Jones et al. (2012)).


References


**Related topics**

Chapter 5, Cognitive semantics; Chapter 6, Corpus semantics; Chapter 10, Semantics and pragmatics; Chapter 17, Negation and polarity