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Semantics

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Preface

This book grew out of a semantics course taught at the second-year level in the general Arts or Sciences bachelor's degree at the University of Canterbury. Most of the students are studying linguistics or philosophy as a major subject, but they also come from a number of other fields in the humanities, physical sciences or professional studies. They generally have taken an introductory course in either linguistics or philosophy.

A mixed undergraduate class in semantics presents the dilemma of deciding what to do about the conceptual and notational complexity of formal theories. A detailed formalization procedure is not of the greatest interest to many of the students, and if the full formal apparatus is used, it isn't possible to introduce more than a limited range of data. If a very limited range of data is covered, this leaves a gap in the linguistics programme, particularly for the teaching of syntax, where some acquaintance with semantic issues is increasingly useful and important. The aim of this book is to introduce a wider range of topics in formal semantics with a limited formal apparatus.

Chapters 1–4 are introductory to the rest of the book, but a selection can be made from the remaining chapters. There are several themes that could be followed: Chapters 4–6 cover NP interpretation and Chapters 8–10 cover events and thematic roles. Verbal and nominal aspect is covered in sections of Chapters 6 and 7 and Chapter 9.

The text is intended to be used as a coursebook, accompanied by lectures on the topics covered and by discussion of the exercises. This book is not a 'teach yourself' text for private, unassisted study. The exercises included are of varying difficulty – some are for basic review and are suitable for private revision, but the more demanding exercises may best be used as the basis of class discussion sessions.

As always, students are urged to also read other introductions to semantics which take a different approach.

1 Introduction

The study of linguistic meaning is generally divided in practice into two main fields, semantics and pragmatics. **Semantics** deals with the literal meaning of words and the meaning of the way they are combined, which taken together form the core of meaning, or the starting point from which the whole meaning of a particular utterance is constructed. **Pragmatics** deals with all the ways in which literal meaning must be refined, enriched or extended to arrive at an understanding of what a speaker meant in uttering a particular expression.

This division can be roughly illustrated with (1) below.

(1) I forgot the paper.

Semantics provides the literal meaning of the elements *I*, *forget*, past tense, *the* and *paper*, and the meaning drawn from the order of the words, giving very approximately ‘The person who is speaking at some time before the time of speaking forgot a particular item which is a paper’. Pragmatic considerations flesh this out to a more complete communication.

Suppose that it is Sunday morning. Anna, the speaker, has just returned to her flat from the local shops where she went to buy croissants and the Sunday newspaper. In this context her flatmate Frances understands Anna to say that she forgot to buy a copy of the Sunday newspaper for that morning, and the time of her forgetting was while she was at the shops – she presumably remembered her intention to buy a paper when she set out and has obviously remembered it on returning. If the shops are nearby, Anna might also intend Frances to infer that Anna will go back for the paper.

Suppose, alternatively, that a man has been found murdered in the fields near a farmhouse. Two nights before the body was found the farmhouse was broken into, although nothing was reported missing. The owners of the house are renovating a small upstairs room, and the floor of this room is currently littered with sticky scraps of stripped wallpaper. The dead man was found with a scrap of the wallpaper on the sole of his shoe. Two detectives are discussing the case. One has just finished speculating that the murder is connected to another set of recent events in the nearby town, and is not related to the break-in at the farmhouse. She then stops and says ‘I forgot the paper’.

In this context her colleague understands her to mean that while she was working through her alternative scenario she forgot the wallpaper scrap on the dead man’s shoe. Given the background assumption that the scrap of paper proves the man’s presence upstairs in the farmhouse at some stage, her

utterance is also understood to mean that she withdraws her speculative alternative scenario, which is probably not correct.

Examples like these demonstrate the enormous contribution of pragmatic information to communication. On the other hand, the starting point from which we arrive at both fleshed-out meanings is the constant contribution of the literal meaning of *I forgot the paper*.

This book will mainly concentrate on literal meaning, the content of words and expressions which is fairly constant from one occasion of use to another. The kind of semantic/pragmatic division illustrated above is discussed in detail in Chapter 11.

1.1 KINDS OF MEANING

1.1.1 Denotation and Sense

There are two most basic ways of giving the meaning of words or longer expressions. The first and most simple way is to present examples of what the word **denotes**. For example, the word *cow* can be defined by pointing to a cow and saying ‘That is a cow’, or the word *blue* can be defined by pointing to a blue object and saying ‘That colour is blue.’ Definition by pointing to an object of the kind in question, called **ostensive definition**, appeals directly to the **denotations** of the words defined. The word *blue* denotes the colour blue, or blue objects in the world, and the word *cow* denotes cows. The general point is that linguistic expressions are linked in virtue of their meaning to parts of the world around us, which is the basis of our use of language to convey information about reality. The denotation of an expression is the part of reality the expression is linked to.

The second way of giving the meaning of a word, commonly used in dictionaries, is to paraphrase it, as illustrated in (2).

(2) *forensic* ‘pertaining to courts of law and court procedures’

export ‘to send out from one country to another, usually of commodities’.

This kind of definition attempts to match the expression to be defined with another expression having the same **sense**, or content. The clearest kind of sense-for-sense matching is translation from one language to another. To say that *le train bleu* means ‘the blue train’ is to say that the French expression and the English expression have the same sense.

The most widely discussed form of the sense/denotation distinction is the **sense/reference** distinction. An expression which denotes just one individual is said to **refer** to that individual. Titles and proper names are common referring expressions.

Suppose, for example, that some of the winners of the Mr Muscle Beach Contest are Wade Rodriguez (1992), Denzel Lucas (1993), Josh Minamoto (1994) and Rob Cabot (1995). The expression *Mr Muscle Beach* has a constant sense which one might paraphrase as '(title of) the winner of an annual body-building competition called the Mr Muscle Beach Contest', but depending on the year in which, or about which, the expression is used it refers to Rodriguez, Lucas, Minamoto or Cabot. This general pattern of a constant sense allied with changeable reference is discussed in more detail in Section 5.5.

Sense and denotation do not have parallel status. In the context of the anecdote above the expression refers at different times to Wade Rodriguez, Denzel Lucas, Josh Minamoto and Rob Cabot. The fact that the expression refers to one of these men at a given time depends on, and follows from, the sense of the expression. It is only because the expression has the sense '(title of) the winner of an annual body-building competition called the Mr Muscle Beach Contest' and Lucas won the competition in 1993 that the expression refers to Lucas in 1993. And given the sense of the expression, it cannot denote anyone who has not won the competition in question. So sense is more basic than denotation, and denotation is dependent on sense.

Sense and denotation are the fundamental aspects of meaning in general. The next two sections review different ways of partitioning complex meanings in terms of their components.

1.1.2 Lexical and Structural Meaning

The meaning of a complex expression such as a sentence is composed of **lexical meaning**, which is the meaning of the individual words, and **structural meaning**, which is the meaning of the way the words are combined.

Structural meaning mainly comprises the meaning derived from the syntactic structure of an expression, for example:

- (3)a The rat that bit the dog chased the cat
 b The cat that chased the dog bit the rat
 c The rat that chased the cat bit the dog
 d The dog that chased the rat bit the cat
 e The dog that bit the rat chased the cat
 f The dog that chased the cat bit the rat
 g The dog that bit the cat chased the rat
 h The dog that chased the cat chased the rat
 i The dog that chased the rat chased the cat ... and so on ...

From a vocabulary of seven words (*the, that, rat, dog, cat, chased, bit*) we can construct a large number of different sentences with different meanings, all based on a single syntactic structure with a common 'meaning template':

(4) [The A [that B-ed the C]] D-ed the E

- x is an A
- x performed the D action
- y is an E
- y undergoes the D action
- x performed the B action
- z is a C
- z is the undergoer of the B action

The meaning components outlined in (4) are examples of syntactic meaning.

Any theory of human language has to be compatible with the fact that human languages are instantiated in human minds, which have a finite capacity. Although the language known by any one person at a given point in time contains a fixed number of words, it can in principle produce, or generate, infinitely many sentences, because the syntax is recursive. **Recursiveness** is the property of embedding a phrase inside another phrase of the same kind, which allows for sentences to be extended in length indefinitely. The examples below illustrate two kinds of recursion many times repeated.

- (5)a The car broke down because Tom forgot to fill the tank because he was running late because Bill rang him just when he was leaving because Bill wanted to sell John a home gym because he doesn't use the home gym anymore and he needs the money because he spent too much money last month because he went for a quick holiday because he needed a break . . .
- b This is the maiden all forlorn that milked the cow with the crumpled horn that tossed the dog that chased the cat that killed the rat that ate the malt that lay in the house that Jack built.

The examples in (5) show that recursion can be used to lengthen a sentence by adding to it. For example, the sentence *The car broke down* can be lengthened by adding *because Tom forgot to fill the tank*, giving two sentences, the original one and the longer one. In principle, any sentence can be used to form a new sentence by using a recursive addition, and so the number of sentences is infinite.

Given that the language has infinitely many sentences, our knowing a language cannot possibly amount to memorizing its expressions. Rather, we know the vocabulary and the syntactic rules for generating sentences. The syntactic rules themselves are a finite number, probably a fairly small number.

We can also match meanings to these infinitely many sentences, and again, we can't possibly do this by memorizing sentence/meaning pairs. Most of the

sentences we hear and understand are heard for the first time, and could not have been learned ahead. It must be that along with the syntactic rules for forming phrases and sentences, we also know interpretation rules which combine meanings just as syntactic rules combine forms. Accordingly, linguistic meaning is **compositional**. Compositionality is the property of being composed from parts. Syntactic and semantic rules work in parallel.

Structural meaning also overlaps with the meaning of syncategorematic expressions, introduced in the next section.

1.1.3 Categorematic and Syncategorematic Expressions

The distinction between categorematic and syncategorematic expressions applies to individual words, rather than phrases. Meaningful inflections can also be included here, as they are syncategorematic.

Categorematic expressions, which include the vast majority of words, are the descriptive words such as nouns, adjectives and verbs. These words are termed categorematic because their descriptive content, or sense, provides a basis for categorization. For example, the descriptive content of the word *chimney* provides the basis for forming the category of chimneys, the sense of *blue* provides the basis for the category of blue things, the senses of the words *domestic*, *professional*, *commercial*, and so on provide the basis for categories of things and activities, and so on.

Syncategorematic words are all the rest, including the examples here.

(6) *as, some, because, for, to, although, if, since, and, most, all, . . .*

What syncategorematic words have in common is that they do not have independent, easily paraphrasable meanings on their own, and we can only describe their meaning by placing them in a context. Unlike the categorematic words, they are not themselves descriptive of reality, do not denote parts of reality. Rather, they serve to modify categorematic expressions or to combine them in certain patterns.

Examples of modifying expressions are tense, illustrated in (7a–c), and modality, illustrated in (7d–e). (Tense and modality are discussed further in Chapters 3 and 7.)

- (7)a He believed us.
- b He believes us.
- c He will believe us.
- d He might believe us.
- e He must believe us.

In (7a–c) the tense endings *-ed* and *-s* and the future auxiliary *will* are combined with the same base sentence form *He BELIEVE us*. The basic

sentence form describes a state of affairs, and semantic tense locates this state of affairs in the past, present or future. The past, present or future content of the tense expressions (*-ed*, *-s*, *will*) doesn't stand alone, but must combine with a sentence to be given a particular interpretation. These expressions do not in themselves denote the past, present and future – that is, they do not have the same senses as the expressions *past/the past*, *present/the present*, *future/the future*.

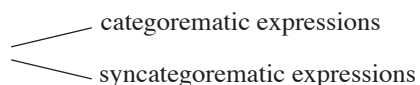
The same base sentence *He BELIEVE us* appears in (7d–e), but here the state of affairs of his believing us is not located in the past, present or future. Rather, the modal (*might*, *must*) expresses a qualification on whether or not there is such a state of affairs. There is room for doubt in (7d) but not in (7e).

An example of a syncategorematic expression combining descriptive expressions is *all* in the examples below.

- (8)a All diamonds are hard.
 b All dogs like icecream.
 c All zinks neb.
 d *All A B.* (*All As are B* or *All As B*)

The general form of the framework for *all*, given in (8d), is just as clear when filled with nonsense words as in (8c). *All* sets up a relationship between A and B. Thinking in terms of categories, we can say that 'All A B' places the A category inside the B category – the Bs include the As. For example, the category of hard things includes the category of diamonds (8a), the category of icecream-likers includes the category of dogs (8b), and the category of nebbers, whatever they are, includes the category of zinks, whatever they are (8c). The meaning of *all* is defined in terms of the way it relates the meaning of the A predicate to the meaning of the B predicate, rather than being defined apart from a context, and this gives *all* a syncategorematic character. (The quantificational determiners, including *all*, are discussed in Chapter 4.)

In summary, lexical meanings may be either categorematic or syncategorematic. Syncategorematic expressions, both words and inflections, group naturally with structural meaning, because they must be defined in terms of the constructions they appear in.

- (9) lexical meaning 
 - categorematic expressions
 - syncategorematic expressions

1.2 STUDIES BASED ON SENSE

In the anatomy of a complex expression such as a sentence the categorematic words make the clearest contribution to sense. These are the words which

generally have the most recognizable or identifiable senses when considered in isolation, and so they seem to be the best starting point for studies of sense.

1.2.1 Lexical Sense

Certain aspects of lexical sense involving relationships among word senses are readily analysable. Some illustrations from this area are given in this section, and references for further reading are at the end of the chapter. The discussion of antonyms below is based on Cruse (1986).

One of the most familiar sense relations is opposition or **antonymy**. Young children can identify opposites, or antonyms, such as *black* and *white*, and opposition is the basis of many doublet sayings and rhetorical devices such as *from top to bottom*, *hither and yon*, *by night and day*, and so on. Various uses of words in antonym pairs reveal that there are several different kinds of antonym with different internal sense structures.

Perhaps the most basic antonyms are **complementaries**, such as *open/shut*, *dead/alive*, and *hit/miss*. The entities these terms apply to are either one thing or the other.

- (10)a A door is either open or closed.
 If the door is open then it is not closed.
 If the door is not closed then it is open.
 If the door is closed then it is not open.
 If the door is not open then it is closed.
 (A door which is slightly open is still open.)

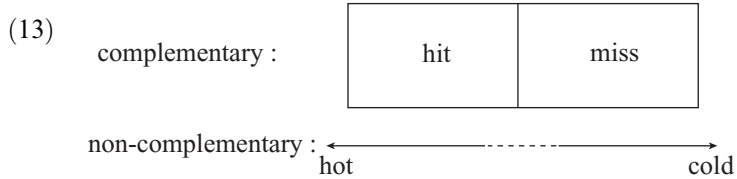
Similarly, a life-form (animal or vegetable) is either alive or dead, and if you shoot at a target you either hit it or miss it. Complementaries are anomalous in sentences like (11). The sign ‘#’ indicates semantic anomaly.

- (11)a # The door is neither open nor closed.
 b # He shot at the target and he neither hit it nor missed it.
 c # The dog is neither alive nor dead.

Most opposites are not complementary, for example:

- (12)a The water is neither hot nor cold.
 b The performance was neither good nor bad.
 c He is neither short nor tall.

Non-complementary opposites are based on a scale with opposite poles and a neutral middle zone. The difference between the two kinds can be represented as in the diagrams below.



Non-complementaries are further subdivided according to how the terms are used for different parts of the scale.

Polar antonyms, such as *heavy/light*, *fast/slow*, *high/low*, and *wide/narrow* give the opposite poles on a scale for a particular property which commonly has a separate neutral term.

- (14)
- | | |
|-------------|--------|
| heavy/light | weight |
| fast/slow | speed |
| long/short | length |
| high/low | height |

The basic statements *It is long* and *It is short* place an object at or near one pole for the property of length. The actual measured values, for example in centimetres, which count as long or short depend on perceived norms for the kind of object described.

In a simple question one of the terms stands for the neutral property the whole scale relates to. For example, the question *How long is it?* carries no expectation that the object concerned is either long or short, but the question *How short is it?* is appropriate where the object is expected or known to be short. *Long* stands for the neutral property of length in this kind of question, but *short* covers only the short end of the length scale.

Polar antonyms like *long/short* are characterized by the generality of their comparative forms, in that the comparisons *A is longer than B* and *B is shorter than A* can be used naturally of any two objects, whether they are long or short.

- (15)
- | | |
|-------------------------|----------------------|
| A and B are both long. | A is longer than B. |
| | B is shorter than A. |
| A and B are both short. | A is longer than B. |
| | B is shorter than A. |

Comparatives like these are called **pseudocomparatives**. Suppose we make a contrast between longness, the property of being long, and length, the property of having linear extent (whether long or short). The pseudocomparative *longer* can be used to relate two short objects because it relates different degrees of length or linear extent rather than different degrees of

longness. Then the two underlined morphemes in (16) have different senses, 'linear extent' in (16a) and 'longness' in (16b).

- (16)a A and B are both short, but A is longer than B.
 b It is long.

Another set of antonyms, termed **overlapping antonyms** by Cruse, is largely based on the *good/bad* opposition, and includes evaluative terms such as *pretty/plain*, *kind/cruel*, and *polite/rude*. In this set the positive pole comparative is a pseudocomparative and the negative pole comparative is a true comparative, for example:

- (17)a A and B are both rude, but A is more polite than B.
 b A and B are both rude, but B is ruder than A.
 c A and B are both polite, but A is more polite than B.
 d # A and B are both polite, but B is ruder than A.

There isn't really a neutral term for a property covered by the whole *polite/rude* scale, but suppose there is such a property – call it 'demeanour'. Then the pseudocomparative *more polite* means 'a greater degree of demeanour' rather than 'a greater degree of politeness', and can be used of polite or rude people, while the true comparative *ruder* means 'a greater degree of rudeness' and can only be used of rude people.

There are also **equipollent antonyms**, including *hot/cold*, *nice/nasty*, and *happy/sad*. Both poles of equipollent antonyms form true comparatives.

- (18)a A and B are both nice, but A is nicer than B.
 b # A and B are both nice, but B is nastier than A.
 c A and B are both nasty, but B is nastier than A.
 d # A and B are both nasty, but A is nicer than B.

Here niceness and nastiness are not coded as poles on a continuous scale but as distinct properties. If something is nice it can't be said to have any degree of nastiness, and vice versa.

Hot and *cold* form a mixed scale. They resemble equipollent antonyms because they fit the pattern shown in (18). But *hot* and *cold* also resemble typical polar antonyms in describing a measurable property with a neutral term *temperature*, so one might expect *hot* and *cold* to form pseudocomparatives, as pseudocomparatives are typical of polar antonyms. In this case the pseudocomparatives would express greater or lesser degrees of temperature, rather than of heat or cold (that is, hotness or coldness). In fact, pseudocomparatives on the temperature scale are formed from the intermediate terms *warm* and *cool*.

- (19) A and B are both hot:
 A is hotter than B ‘a greater degree of hotness’
 B is cooler than A ‘a lesser degree of temperature’
 # B is colder than A

A and B are both cold:
 A is colder than B ‘a greater degree of coldness’
 B is warmer than A ‘a greater degree of temperature’
 # B is hotter than A.

Other major sense relations studied in traditional lexical semantics are synonymy, hyponymy and meronymy. If A and B are **synonyms** they have the same sense – in fact true lexical synonymy is rare, but *oculist* and *eye-doctor* are candidates for synonymy. If A is a **hyponym** of B then an A is a kind of B. *Dachshund*, *spaniel* and *terrier* are hyponyms of *dog*. If A is a **meronym** of B then an A is part of a B. *Finger* and *palm* are meronyms of *hand*; *sole*, *heel*, *upper*, *tongue* and *insole* are meronyms of *shoe*.

1.2.2 Semantic Features

Word senses may also be analysed in terms of sense components, also called **semantic markers** or **semantic features**, particularly those which determine classifications like the system illustrated in (20).

(20)	human	man	woman	child	girl	boy
	horse	stallion	mare	foal	filly	colt
	sheep	ram	ewe	lamb		
	cattle	bull	cow	calf		
	swan	cob	pen	cygnet		
	pig	boar	sow	piglet		
	hare	buck	doe	leveret		
	deer	buck	doe	fawn		
	cat	tom	queen	kitten		
	dog	dog	bitch	puppy		

All the terms in the system can be defined in terms of species and the components or features ADULT/JUVENILE and MALE/FEMALE. So, for example, the word *stallion* might be defined as [EQUINE, ADULT, MALE], *lamb* as [OVINE, JUVENILE] and *pig* as [PORCINE].

1.2.3 Basic Category Words

Word sets like those in (20) demonstrate the plausibility of the semantic components MALE/FEMALE and ADULT/JUVENILE, but components

like EQUINE and PORCINE are more controversial. Given that the property of being equine is simply the property of being a horse, if EQUINE is a semantic marker then it must be the whole content of the word *horse*. Intuitively this seems mistaken, as the sense of the word *horse* is felt to be far more complex than such an analysis would indicate.

In fact, the sense of basic category words such as *horse*, *pig* and *bird* is difficult to analyse further. Take a dictionary definition for *horse*:

a solid-footed perissodactyl quadruped (*Equus caballus*), having a flowing mane and tail; its voice is a neigh. In the domestic state used as a beast of burden and draught, and especially for riding upon.

(*Shorter Oxford English Dictionary*, 3rd edn, reprinted 1968, p. 923)

The three types of information given here – zoological classification, physical description and general information – would also appear under *horse* in an encyclopaedia. Information listed in an encyclopaedia is offered as general knowledge about things in the world, in this case about horses, while information listed in a dictionary is offered as information about words and their senses. With species terms it is very difficult to separate encyclopaedic knowledge about the thing denoted from dictionary knowledge about the sense of the word – there seems to be no separately statable sense which is not simply a description of the typical object.

In cases like these the definition given is a bit like ostensive definition rather than definition by sense matching. The information given, particularly the species' Latin name *Equus caballus*, identifies what the word *horse* denotes. If you aren't familiar with the zoological classification, the information 'solid-footed . . . quadruped . . . , having a flowing mane and tail; . . . used as a beast of burden and draught, and especially for riding upon' might be enough to single out horses, and you can then conclude that the word *horse* denotes that kind of animal. Arguably, this is what the word *horse* means – it means little more than that it has a certain denotation, similarly with words like *pig* and *bird*. To say what *horse* means is to say what a horse is, and ultimately this can only be done by a kind of ostension – 'a horse is one of those'.

If the sense of words like *horse*, *pig* and *bird* is little more than the fact of having a certain denotation, there must be some other role for all the information which seems to attach to these words. The point is easily illustrated with *bird*.

- (21) *BIRD* 1 flies, has wings
 2 sings sweetly
 3 is small and light
 4 lays eggs in a nest
 5 is timid

Points 1–3 are quite likely to come to mind as components of the sense of *bird*, particularly because these properties are the basis of metaphors and similes such as *fly/sing like a bird*. But although these seem to be obvious bird properties not all birds have them. Many birds do not fly (kiwi, ostrich, emu, pukeko, moa, takahe, penguin), many birds are not small and light (Emperor penguin, moa, ostrich, emu) and many birds do not sing sweetly. Not all birds are timid – swans, geese and magpies can be very aggressive.

These properties of birds contrast strongly with semantic components such as MALE/FEMALE and ADULT/JUVENILE, which are always present in any use of a word containing them. ‘This is a stallion’ entails ‘This is male’ and ‘This is adult’, and ‘This is a piglet’ entails ‘This is juvenile’. The bird features, on the other hand, are not always present with the word – ‘This is a bird’ does not entail ‘This flies’ or ‘This sings sweetly’. The contrast indicates that the bird features listed in (21) are features of a cognitive concept, not semantic features of a word sense.

Findings in cognitive psychology indicate that mental concepts of concrete entities such as birds are structured around prototypes. The central bird prototype, for example, is a generalized average or prototypical bird. The prototypical bird flies and sings, has a fairly small roundish body and round head, a small beak, short legs and dull-coloured plumage. Real birds fall at various distances from the prototype depending on their similarity to that prototype. Thrushes, sparrows, starlings and blackbirds are close to the prototype. Birds like parrots, turkeys, emus, flamingos, cranes, kiwis and penguins are further from the prototype in features like size, body shape, colour and lack of flight.

If you are asked to quickly visualize a bird, the chances are that you will visualize something near the prototype, such as a sparrow, or the prototype itself, which isn’t any particular bird species. If you are shown pictures of assorted objects including birds and asked to pick out those that are birds, it takes a moment longer to recognize non-prototypical birds, such as flamingos or penguins, as birds, even though they are well known. The prototype is like a mental template for recognizing birds which works better (or faster) for some birds than for others.

Were we to identify conceptual prototypes with word senses, we would be led to conclude that senses themselves reflect the inner grading which ranks sparrows and thrushes as more birdlike than emus and turkeys. One might say that a sparrow is 100 per cent a bird but a turkey is only 70 per cent a bird, or that the statement *This turkey is a bird* is only 70 per cent true.

However, this conclusion seems to confuse prototypes with **vague predicates**, such as *bald*, *crowd* or *orange*. How many hairs can a bald man have and still be bald? How small can a group of people be and still be a crowd? Vague predicates have undefined boundaries. Suppose you have a coloured ribbon which is red at one end and yellow at the other, changing gradually from one shade to the other through the length of the ribbon. The middle

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