**CHAPTER 7**

Word meanings and concepts

**7.1 Introduction**

**7.2 The nature of concepts**

**7.3 Domains**

**7.1 Introduction**

Our approach isbased on the assumption that the most direct connections of linguistic forms

(phonological and syntactic) are with conceptual structures.

**7.1.1 The importance of concepts**

Concepts are organized bundles of stored knowledge representing an articulation of events, entities, situations, and so on in our experience. If we were not able to assign aspects of our experience to stable categories, it would remain disorganized chaos.

**7.1.2 Word-concept mapping**

We shall assume a fairly simplistic model both of conceptual structure and of the relations between linguistic forms and concepts. In this model, concepts are linked together in a complex multi-dimensional network (see Fig. 7.1). The links are of specific types (e.g. is *a kind of, is a part of, is used for,* etc.) and are of variable strength. Linguistic forms map on to conceptual structures of comparable complexity. Here we shall confine our attention to individual words. Each full lexical item directly activates a concept and indirectly activates linked concepts

according to the strength of the link. There is no direct link between, for instance, the word *horse* and the concept ANIMAL: the word *horse* has a direct link only with the concept HORSE.

The mapping between words and concepts may be any of the following:

(i) one-to-one: in this arrangement, a word gives access to a single concept;

an example might be:

syzygy \_\_\_\_\_\_\_\_\_\_\_\_\_\_SYZYGY



(iv) a many-to-many mapping is also possible, but it arises from a combination

of (ii) and (iii) above.

The three words/expressions which map on to DIE in (iii) above are not identical in meaning, therefore since they all map on to the same concept, the differences between them must be a property of the words themselves, not of the concepts; these may be termed **word-specific properties.**

**7.1.3 Conceptual structure**

It is usually taken for granted that the expressive possibilities of language are infinite: not only is there an infinite number of possible grammatical constructions in a language, there is no area of semantic space that cannot be designated linguistically, and semantic space is considered also to be in principle infinite. Since the brain is a finite physical object, it cannot store an infinite number of linguistic forms mapped on to an infinite number of concepts.

Hence, just as the formal side of language solves the problem of infinity

by providing a set of units with recursive rules for combination.

Three independent levels of structure are proposed by Jackendoff: phonological, syntactic, and conceptual, the latter constituting the level of meaning. In many linguistic theories, a level of semantic structure is postulated, in addition to conceptual structure. Only the former is 'truly linguistic', the latter being part of general cognition.

**7.2 The nature of concepts**

Concepts have the status of categories. In this section we shall consider how conceptual categories can best be characterized.

**7.2.1 The classical approach**

The classical approach to categorization, which goes back at least to Aristotle, but is still often taken for granted, defines a category in terms of a set of **necessary** **and sufficient criteria** (or conditions, or features) for membership. So, for instance, the criteria for some X to qualify for inclusion in the category GIRL are:

X is human

X is female

X is young

If any of these criteria are not satisfied, then X is not a girl (i.e. the criteria are **individually** necessary); if all the criteria are satisfied, then X is a girl (i.e. the criteria are **jointly sufficient).** (The above set of criteria can be taken as a definition of the meaning *of girl.)*

**7.2.2 Some problems of the classical approach**

There is a certain undeniable obviousness about this way of defining categories.

However, it has a number of shortcomings.

**7.2.2.1 Lack of plausible analyses**

The superficial plausibility of the Aristotelian analysis of *girl* (and similar words) is misleading. The words like *girl,* which apparently can be satisfactorily defined by means of a set of necessary and sufficient features constitute a relatively small proportion of the vocabulary at large, and are confined to certain semantic areas, such as kinship, and specialized terms for animals specifying age and sex, and so on. There are many everyday words whose meanings cannot be captured by means of a set of necessary and sufficient features. Wittgenstein's famous example is *game.* He argued that it was *impossible* to draw up a list of features possessed by all games which jointly distinguish games from non-games. One might suggest the following as possible criteria:

(i) involves winning and losing: there are many games which do not involve winning and losing: party games, such as charades, Matthew, Mark, Luke, and John, kissing games; children's games such as leapfrog, hallalevo, and hopscotch, etc.

(ii) involves more than one person: solitaire is a game for one person.

(iii) has arbitrary rules: again, children's games, such as dressing-up games, and ducks and drakes, have no statable rules.

(iv) done purely for enjoyment: many games are played professionally.

**7.2.2.2 Fuzzy boundaries**

An Aristotelian definition of a category implies a sharp, fixed boundary. However,

much empirical research on category structure has shown that the boundaries of natural categories are fuzzy. For instance, Berlin and Kay (1969), who studied colour categories, found that while judgements of central examples of colours were relatively constant across subjects and reliable within subjects on different occasions, judgements of borderline instances, for instance between red and orange, or between blue and purple, showed neither agreement amongst subjects nor reliability with a single subject on different occasions.

**7.2.2.3 Internal structure of categories**

As far as the classical conception of categories goes, everything that satisfies the criteria has the same status, that is to say, something is either in the category, or not in it, and that is all there is to say about the matter. However, language users have clear intuitions about differences of status of items within a category: some members are felt to be 'better' examples of the category than others. For instance, an apple is a better example of a fruit than is a date, or an olive. In other words, categories have internal structure: there are central members, less central members, and borderline cases. No account of these facts can be given using the classical approach.

**7.2.3 The standard prototype approach**

We shall first of all describe what might be called the 'standard' approach to prototype theory, deriving from the work of Eleanor Rosch (1973, 1978). The main thrust of Rosch's work has been to argue that natural conceptual categories are structured around the 'best' examples, or **prototypes** of the categories, and that other items are assimilated to a category according to whether they sufficiently resemble the prototype or not.

**7.2.3.1 GOE and family resemblance**

Rosch's most basic experimental technique is the elicitation of subjects' **Goodness-of-Exemplar (GOE) ratings.** Subjects are asked to give a numerical value to their estimate of how good an example something is of a given category. The rating scale typically goes something like this:

1: very good example

2: good example

3: fairly good example

4: moderately good example

5: fairly poor example

6: bad example

7: very bad example/not an example at all

So, for instance, if the category was VEGETABLE, the ratings of various items

might be as follows:

**POTATO, CARROT I**

**TURNIP, CABBAGE 2**

**CELERY, BEETROOT 3**

**AUBERGINE, COURGETTE 4**

**PARSLEY, BASIL 5**

**RHUBARB 6**

**LEMON 7**

Ratings of GOE may be strongly culture dependent. For instance, in a British context (say, a typical class of undergraduates), DATE typically receives a GOE score of 3-5 relative to the

category of FRUIT, but an audience of Jordanians accorded it an almost unanimous 1.

Wittgenstein described the instances of the category GAME as manifesting a relationship of **family resemblance**: the members of a human family typically resemble one another, but there may well not be any set of features that they all possess, and it may be possible to find two members who have no features in common. However, they will be linked by a chain of intermediate members with whom they do share features. So, for example, A may have no features in common with C, but has the same nose as B, who in turn has the same eyes as

C. Prototype theory embraces Wittgenstein's notion that family resemblance unites the members of a category, but adds to it the vital idea of central and peripheral members.

**7.2.3.2 Prototype effects**

Taken in isolation, the existence of stable GOE scores might be thought to be of minor cognitive significance. However, there is abundant evidence that prototypicality, as measured by GOE scores, correlates strongly with important aspects of cognitive behaviour. Such correlations are usually referred to as prototype effects. The principal prototype effects are as follows:

*Order of mention*

When subjects are asked to list the members of a category, and especially if they are put under time pressure, the order of listing correlates with GOE ratings, with the prototypical member showing a strong tendency to appear early in the list.

*Overall frequency*

The overall frequency of mention in such lists also correlates with GOE score.

*Order of acquisition*

Prototypical members of categories tend to be acquired first, and order of acquisition correlates with GOE rating.

*Vocabulary learning* Children at later stages of language acquisition, when vocabulary enlargement can be greatly influenced by explicit teaching, learn new words easily if they are provided with definitions that focus on prototypical instantiations.

 The following is not included in the in-term.

*Speed of verification*

In psycholinguistic experiments in which subjects are required to respond as quickly as they can to a categorization task, subjects produce faster responses if the tasks involve a prototypical member. In a typical set-up, subjects see a pair of words, say FRUIT:BANANA, flashed up on a screen, and they are to respond as quickly as possible by pressing one of two buttons, the one labeled *Yes* if the second named item belongs to the category indicated by the first item

and *No* otherwise. Results show that responses to, for instance, FRUIT:APPLE, where the second item is a prototypical member of the class denoted by the first, are faster than, say, FRUIT:DATE (for average British subjects).

*Priming*

Another psycholinguistic technique involves the phenomenon of priming. In a typical set-up, subjects see strings of letters flashed on to a screen and their task is to respond *Yes* (by pressing the appropriate button) if the string of letters makes a word of (say) English, and *No* if it does not. Responses are timed electronically. It is a well-established experimental fact that if a word is

preceded by a semantically related word, response to it will be speeded up. So, for instance, a *Yes* response to DOCTOR will be faster if NURSE has been just previously presented. It is found that the presentation of a category name has the greatest speeding-up effect on the prototype of a category, and the effect is proportionately less as we move away from the centre of the category

to the periphery (as measured by GOE scores).

**7.2.3.3 Intuitive unity, definitional polyvalence**

A purely linguistic characterization of categories with a prototypic organization is that they show intuitive unity, but are definitionally polyvalent. That is to say, they cannot be captured by means of a single definition, but require a set of definitions. For instance, the semantic

field covered by the term *game* can be quite well described by means of a restricted set of definitions, but no satisfactory unitary definition exists.

**7.2.3.4 Fuzzy boundaries**

A common position is to maintain that only the prototype has 100 per cent membership of a category, the degree of membership of other items being dependent on their degree of resemblance to the prototype, this, in turn, being reflected by their GOE score. From this one would have to conclude that a natural category has no real boundaries.

**7.2.3.5 The mental representation of categories**

The earliest hypotheses regarding the mental representation of categories suggested that there was some sort of portrait of the prototypical member, against which the similarity of other items could be computed and their status in the category determined. However, many prototype theorists (e.g. Lakoff) speak only of 'prototype effects', and remain uncommitted on the subject of the form of mental representations.

More recently, feature-based treatments of prototype structure have appeared. With these, categories with a prototype structure are represented by a set of features. However, unlike the classical features, these do not constitute a set of necessary and sufficient criteria, except perhaps for the prototype

itself. Rather, the features are such that the more of them that are manifested in some particular instantiation, the higher the GOE score the item in question will obtain (note that in GOE terms, a score of 1 is high and 7 low). In such systems, features may be differentially weighted, that is to say, some features will have a greater effect on determining centrality in the category than others (there is nothing in principle to prevent some features being necessary). The general idea can be illustrated using the category VEHICLE. The features listed in (1) would seem to be plausible (note that these have not been subjected to empirical testing, they are based on my intuitions: the list is illustrative, not necessarily exhaustive):

(1)

(a) Designed to go on roads.

(b) Has its own propulsive power.

(c) Can go faster than an unaided human.

(d) Can carry persons/goods in addition to driver.

(e) Has four wheels.

(f) Metallic construction. (g) Persons/goods enclosed. (h) Manoeuvrable.

Clearly a central example of the category of vehicle, such as CAR, will have all these features. If they are correct, it ought to be possible, for items judged not to be central, to pinpoint features they do not possess. For instance, a typical class of students will mark the following items as non-prototypical in the class of VEHICLE. For each of them, there are features from the above list which are missing:

TRAIN: Not designed to go on roads.

 Not manoeuvrable.

TRACTOR: Not designed to go on roads.

 Driver not always covered.

BICYCLE Doesn't have own propulsive power.

 Does not carry persons/goods in addition to driver.

**7.2.3.6 Basic-level categories**

Categories occur at different levels of inclusiveness, as shown in (2):

(2)

(a) vehicle—**car**—hatchback.

(b) fruit—**apple**—Granny Smith.

(c) living thing—creature—animal—**cat**—Manx cat.

(d) object—implement—cutlery—**spoon**—teaspoon.

One level of specificity in each set has a special status (shown in bold in (2)), called **basic** or **generic** level of specificity. Characteristics of basic-level items are as follows.

(i) The most inclusive level at which there are characteristic patterns of behavioural interaction: imagine being asked to mime how one would behave with an animal. This is rather difficult without knowing whether the animal in question is a crocodile or a hamster. Likewise with, say,

an item of furniture. However, the assignment is relatively easy if it involves a cat, horse, mouse, or chair.

(ii) The most inclusive level for which a clear visual image can be formed: this is similar in principle to the previous characteristic: try to visualize an item of cutlery or a vehicle, without its being any specific type. A fork or a lorry, however, are easy to visualize.

(iii) Used for neutral, everyday reference. Often felt by speakers to be the 'real' name of the referent: suppose A and B are sitting at home; A hears a noise outside and says *What's that?* B looks out of the window and sees an alsatian in the garden. How does B reply? Out of the

following choices, normally (b) will be chosen:

(3)

 (a) It's an animal.

(b) It's a dog.

(c) It's an alsatian.

The other two responses would require special contextual conditions.

(iv) The basic level is the level at which the best categories can be created. Good categories are those which maximize the following characteristics:

(a) distinctness from neighbouring categories;

(b) internal homogeneity;

(c) differential informativeness.

Generally speaking, categories which are more inclusive than the basic level (e.g. ANIMAL) have less internal homogeneity, while narrower categories (e.g. ALSATIAN) show less distinctness from neighbouring categories.

(v) Names of basic level categories tend to be morphologically simple, and 'original', in the sense of not being metaphorical extensions from other categories: take the case of *spoon,* which is a basic-level term; all the more specific categories have more complex names: *teaspoon, tablespoon, soup spoon, coffee spoon,* etc.

**7.2.4 Problematic aspects of prototype model**

While the standard prototype-theoretical approach undoubtedly sheds light on the nature of natural conceptual categories, it is not without its problematic aspects.

**7.2.4.1 The bases of GOE ratings**

The first point is that although subjects readily enough make GOE judgements on the basis of two words (category name and item name), this is surely rather unnatural: it would presumably be more revealing to produce GOE ratings for actual objects or events, etc. For example, APPLE may well receive a high rating in the category FRUIT if only the words are presented, but what if an actual apple were presented, and it happened to be rotten?

**7.2.4.2 Category boundaries and boundary effects**

One of the most serious shortcomings of the 'standard' prototype view is that no category boundary is recognized. Yet a category without a boundary is virtually useless: a primary function of a category is to discriminate between things which are in it and things which are not in it. The classical view of categories, with necessary and sufficient features, set a boundary but allowed no internal structure.

The view taken here is that a fully satisfactory description of a category must specify both internal structure and location of boundary area.

**7.2.4.3 Degrees of membership**

As we have seen, the standard prototype view is that only the prototype of a category has 100 per cent membership of the category, other items having a degree of membership dependent on their resemblance to the prototype. Such a view is possible only if categories are not assigned boundaries. Once boundaries are assigned, then an item must be a full member of the category, not a member at all, or a borderline example. Even a non-central member of a category, like OSTRICH in the category of BIRD, is a full member. On this view, the notion of degree of membership of a category applies only to borderline cases. For instance, most people would probably judge BICYCLE and SKATEBOARD to be borderline instances of the category VEHICLE. Here, the notion ofdegree of membership becomes operational, and I myself, for instance, would judge BICYCLE to have a higher degree of membership than SKATEBOARD.

**7.2.4.4 Compound categories**

The categories which result from the combination of two (or more) basic categories are often regarded as presenting particular problems for prototype theory. The most famous example is PET FISH (GUPPY). As we argued earlier, it is probably unreasonable to expect that the prototype of a compound category XxY should be prototypical in X and Y separately.

**7.2.4.5 Context sensitivity**

From our point of view, the GUPPY problem is one aspect of a much wider problem in prototype theory, namely, the contextual sensitivity of 'centrality'. Typically, GOE ratings are assigned to putative members of named categories out of context. But it is intuitively obvious that judgements of the 'best' examples of, say, the category [CAR] are going to depend on whether one has in mind a racing context, a context of town use, or long-distance travel. It seems

likely that if none of these is made explicit, then the word *car* evokes some sort

of 'default' context; it is unlikely that we make our judgements in a genuine

zero context. How to achieve a way of specifying categories so that contextual

effects can be predicted is a difficult problem.

**7.3 Domains**

An important aspect of conceptual structure is emphasized by Langacker and his followers, and that is that concepts only make sense when viewed against the background of certain **domains,** which are usually themselves concepts of a more general or inclusive nature. As an example, consider the wheel of a bicycle. In isolation from a bicycle (or other wheeled device), a wheel is just a circular structure; but the concept WHEEL is more than this, and can only be characterized by reference to a more inclusive domain of some kind such as BICYCLE. Langacker

refers to the region or aspect of a domain highlighted by a concept as the **profile,** and the domain part of which is rendered salient in this way is called the **base;** thus, WHEEL profiles a region of the base BICYCLE. According to Langacker, the profile cannot be apprehended on its own.

It is important to note that *profile* and *base* are relational terms, not absolute ones. Take the case of WHEEL. This profiles a region of its base BICYCLE. But it in turn functions as the base domain for more specific profilings, such as HUB and RIM and SPOKE.

**Homework**

Do ALL the exercises in this chapter.