The notion of ‘prototype’ in descriptions of the semantic structure of nominal categories

The question under study is the following: what is the semantic structure of a category (e.g. BIRD)? The focus will be on nouns, because of the agrégation syllabus, but also because nouns (more specifically concrete nouns) are the lexical class for which semantic structure models have been developed. Cognitive models, starting especially with the seminal research carried out in cognitive psychology by Eleanor Rosch in the 1970s, have caused a major upheaval in the way we think about this issue. Some of the major questions were: why are we convinced that we know what a vegetable is, yet find it so difficult to come up with a definition? Or why do (Western) informants regularly deem a robin a better example of a BIRD than an ostrich? This had not been taken into account in older models of meaning. From such questions, the notion of ‘prototype’ was coined, initially to refer to the better examples, the central members, of a category (e.g. for BIRD, the robin and other good examples). But descriptions of semantic structure are not totally stabilised today. Approaches that make use of the term ‘prototype’ are often grouped together under the umbrella term ‘prototype theory’, but there is in fact no single, unified theory:

(1) (Laurence & Margolis 1999: 27) There is, of course, no single account to which all prototype theorists subscribe. What we are calling the Prototype Theory is an idealized version of a broad class of theories, which abstracts from many differences of detail.

(2) (Geeraerts 2006 [1989]: 158) The term prototype theory should be used with care, since the theoretical uniformity that it suggests tends to obliterate the actual distinctions between the diverse forms of prototypicality discussed in the literature. The term is used here as a convenient reference mark only, to indicate a number of related theoretical conceptions of categorial structure that share an insistence on […] various kinds of prototypicality effects […]

The term ‘prototype’ takes on slightly different senses depending on the theoretical approach. The aim of this paper is therefore to provide an introduction to the notion of ‘prototype’, to see what problems it means to solve, what conceptions of semantic structure it reflects, and its potential limitations.

Section 1 considers why the notion of ‘prototype’ appeared in the first place, with the rejection of the so-called ‘classical’ theory of conceptualisation. Section 2 then examines several senses of the word ‘prototype’, together with consequences for the description of semantic structure.

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1 ‘Category’ is the most widely used word in cognitive linguistics; but when a further distinction between ‘category’ and ‘concept’ is made, a ‘category’ is a collection of items that are treated as equivalents (e.g. the category BIRD groups together all the items which share the characteristics of birds), whereas ‘the mental representation’ of the category is a ‘concept’ (Markman & Rein 2013: 321).
1. Origins of the notion of prototype: rejection of the ‘classical’ theory of conceptualisation

The very concise overview proposed in this section is meant primarily as a backdrop for prototype approaches and as an opportunity to reconsider some of the objections put forward in cognitive linguistics.

1.1. The so-called ‘classical’ theory

The term ‘classical theory’ was apparently coined by Smith & Medin 1981 (according to Murphy 2004[2002]: 15). The theory has its foundations in the Antiquity (hence the name): it dates back at least to Aristotle. There have been evolutions over the centuries, but here are two major tenets:

1. as summed up by Murphy & Koskela (2010, entry ‘Classical theory of conceptualization’ – underlining added):

   (3) According to the classical theory, concepts are defined in terms of necessary and sufficient conditions of features. For instance, the concept TEENAGER might be defined by the features ‘human’, ‘aged thirteen or older’, ‘aged nineteen or younger’.

This is called a ‘definitional approach’ to meaning: meaning consists of a set of defining features. In other words, a concept is defined in terms of what Aristotle terms the ‘essence’ of a thing (the necessary and (jointly) sufficient conditions that identify its nature), as opposed to its ‘accidents’ (the features that can be removed or altered without changing the nature of the thing).2 For instance, a square requires four sides; this is part of its essence, whereas the size of the square is accidental.

2. there is a clear distinction between the meaning(s) of a word, semantic knowledge, and encyclopaedic knowledge about the entities denoted by the word.3

   The classical approach to meaning led in particular to componential analyses of the lexicon. ‘Componential’ is the idea that each feature is a component of meaning.4 The perspective is contrastive (comparing words), which yields ‘componential tables’, such as (4).

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2 ‘[Pour Aristote.] le concept ou logos, qu’exprime le terme, comme sujet d’attribution, et en quoi se résout la proposition, peut être défini [comme] l’essence d’une chose dans la pensée, indépendamment de ses accidents (comme est le blanc pour l’homme [= as is the fact that a man may be white-skinned]), indépendamment des prédicats qui n’appartiennent pas à l’essence et qui, tout en étant nécessaires, sont dérivés (comme deux droits pour le triangle, ou pour l’homme le langage), indépendamment enfin des propres, c’est-à-dire, des caractères qui sont identiques à la chose en extension, mais non en nature (comme le rire pour l’homme). Le concept, dans son sens à la fois logique et ontologique, […] porte donc sur l’essence, et il n’y a de définition que d’elle.’ (Chevalier 1991 [1955]: 18 – underlining and explicitation in italics added)

3 This dichotomy is reflected in the distinction between a (monolingual) dictionary, which seeks to give ‘an explanation of [the] meaning or meanings’ of a word, and an encyclopaedia, which gives ‘extensive information on all branches of knowledge’ (OED 2017).

4 See for instance Nida (1979 [1975]: 26) ‘the meaning [of a word] consists of that set of necessary and sufficient conceptual features which make it possible for the speaker to separate the referential potentiality of any one lexical unit from that of any other unit which might tend to occupy part of the same semantic domain.’
Most textbook examples, like this one, focus on humans or animals for which the features of species, age or sex can be easily isolated; similarly, a lot of research has been devoted to kinship terms (e.g. sister, cousin, uncle and so on).

1.2. Assessment

Cognitive approaches do not reject componential analyses altogether (Geeraerts 2006 [1989]: 142). These are valuable to ‘give an explicit representation of the systematic relations between words’ (Kempson 1977: 18), as evidenced by the componential table above, or within any semantic field (e.g. to distinguish between a house and a flat, or regret and remorse). Componential analyses also capture semantic relations such as hyponymy: a hyponym (e.g. a rose) inherits all the defining features of its hyperonym (flower): the meaning of rose is the meaning of flower + distinctive features. They are also used, therefore, for automatic or multi-language translation, again in a contrastive perspective.

What cognitive approaches do forcefully reject is the idea that concepts are mentally structured as definitions, as sets of necessary and jointly sufficient features (in other words, they reject a ‘definitional approach’ to semantic structure). A definition does not reflect the cognitive reality of categorisation, which is what cognitive linguistics/psychology attempts to describe. Here are the main objections:

Objection 1: the problem of typicality effects: some elements are deemed better examples (more ‘typical’) than others; they have a different goodness-of-exemplar (GOE) rating.\(^5\) For instance, chairs are considered better examples of FURNITURE than carpets. This is not predicted by the classical approach: if defining features formed the semantic structure, then all members could be expected to be equally good examples.

Typicality effects exist even for categories for which there is a consciously learnt definition, that is, a clear set of necessary and jointly sufficient features. For instance, Armstrong et al. (1983) show that for the category EVEN NUMBER, 8 is regarded as a better example than 10,002. Similarly, it could be said that in (5), a is a better example of a square than \(b\).

(5) squares

\[\begin{array}{c}
a. \\
b. \end{array}\]

\(^5\) In the initial version of the theory, goodness-of-exemplar is equated with degree of membership. In other words, an ostrich, which is not a very good example of a bird, was regarded as having a lesser degree of membership of the category BIRD (Rosch 1975: 193). This was dropped later on, as an ostrich was shown to be a full member of the category regardless.
A reply to objection 1 could be that precisely, the definition of the concept, which has to apply to all potential members of the category, should not be confused with our extra-linguistic, encyclopaedic, knowledge of the entities met in the course of our experience; that our GOE ratings are based on our knowledge, on our experience, and are not relevant to meaning. This reply, however, would not explain what relationship there is between experience and the semantic structure of concepts (how do we get the definition?).

Objection 2: the definition problem:

- Objection 2a: for a lot of very common words, it is difficult for speakers to give a definition in terms of necessary and sufficient features. For instance, what is a ‘vegetable’? Yet speakers are convinced that they know what a vegetable is. To cognitive linguists, if the concept was structured as a set of defining features, speakers should be able to summon them easily.

- Objection 2b: it has been argued by Wittgenstein (1958: 66), a philosopher who inspired cognitive linguists, that some concepts do not have a set of defining features that holds for all members. His famous example is that of GAME. For instance, to him, not all games are ‘amusing’ (e.g. chess), there is not always ‘winning and losing’ (e.g. when a child throws a ball against a wall), or not always ‘competition between players’ (e.g. patience, solitaire). Rather, members are assigned to the category on the basis of ‘family resemblance relations’ with one, or some, of the games:

(6) (Wittgenstein 1958: 66) Consider for example the proceedings that we call ‘games’. I mean board-games, card-games, ball-games, Olympic games, and so on. What is common to them all? Don’t say: ‘There must be something common, or they would not be called “games”’ – but look and see whether there is anything common to all. – For if you look at them you will not see something that is common to all, but similarities, relationships, and a whole series of them at that. To repeat: don’t think, but look! – For example at board-games, with their multifarious relationships. Now pass to card-games; here you find many correspondences with the first group, but many common features drop out, and others appear. When we pass next to ball-games, much that is common is retained, but much is lost. – Are they all ‘amusing’? Compare chess with noughts and crosses. Or is there always winning and losing? Think of patience. In ball-games there is winning and losing; but when a child throws his ball at the wall and catches it again, this feature has disappeared. Look at the parts played by skill and luck; and at the difference between skill in chess and skill in tennis. Think now of games like ring-a-ring-a-roses; here is the element of amusement, but how many other characteristic features have disappeared! And we can go through the many, many other groups of games in the same way; we see how similarities crop up and disappear.

Instead, Wittgenstein argues that the concept of GAME is structured by a network of family resemblances. In the words of Rosch & Mervis (1975: 575), ‘each item has at least one, and
probably several, elements in common with one or more other items, but no, or few, elements are common to all items.’ Ungerer & Schmid (2006: 29) suggest the following representation:

<table>
<thead>
<tr>
<th>Item</th>
<th>Attributes</th>
<th>Overlapping similarities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AB</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>BC</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>CD</td>
<td>C</td>
</tr>
<tr>
<td>4</td>
<td>DE</td>
<td>D</td>
</tr>
</tbody>
</table>

**Assessment:** the lack of common defining features for a whole class has been shown to work for some other lexical concepts, such as *mother* (see Lakoff (1987)’s famous analysis, with the notion of domains)
6, and family resemblance relations have been shown to be essential to understand gender assignment in Dyirbal (an Australian aboriginal language). In his seminal work *Women, Fire and Dangerous Things* (1987), Lakoff shows that in Dyirbal, nouns that denote women, fire or dangerous things belong to the same gender class not because women, like fire, are regarded as dangerous things, but because of an affinity between women and fire (women do the cooking), and then between dangerous things and fire. In other words, the value of that gender is not a feature that is common to the whole class; assignation is based on family resemblance to a subset of elements already in the class.

Wittgenstein’s analysis, however, begs two further remarks. First, the weight of family resemblance relations may vary depending on the category. Ungerer & Schmid (2006: 30) suggest that the number of shared features is much higher for basic-level categories (such as CAR or CHAIR) than it is for superordinate categories (such as TOY or FURNITURE, which group together several kinds of things, especially on the basis of functional commonalities). Secondly, although Wittgenstein’s specific example of GAME is never challenged in the literature (except for Wierzbicka 1996), I would say that it is not entirely convincing. For instance, for a child throwing a ball against a wall to qualify as a game (rather than just filling time), there have to be some sort of *ad hoc*, though vague, rules (what constitutes acceptable moves, what constitutes success or failure), so that the child has to be trying to *win* (the challenge will be to reach the wall, or to reach above a given level, to catch the ball as it bounces back, etc.). There are rules as well for the game of ring-a-ring-a-roses, since a *penalty*

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6 As noted by Lakoff (1987), ‘[t]he concept *mother* is not clearly defined, once and for all, in terms of common necessary and sufficient conditions. There need be no necessary and sufficient conditions for motherhood shared by normal biological mothers, donor mothers (who donate an egg), surrogate mothers (who bear the child, but may not have donated the egg), adoptive mothers, unwed mothers who give their child ren up for adoption, and stepmothers.’ The reason is that the concept *mother* is to be understood against different domains, each of which forms a sort of background against which the concept is set: BIRTH, GENETIC, NURTURENACE, MARITAL, and GENEALOGICAL. For each of these domains, there is an idealised cognitive model (ICM), that is, an ‘ideal case’:

**BIRTH:** the ICM of a mother is a female person giving birth
**GENETIC:** the ICM is a female who contributed half the genetic material
**NURTURANCE:** the ICM of a mother is the female adult who nurtures and raises a child
**MARITAL:** the ICM of a mother is the wife/partner of the father
**GENEALOGICAL:** the ICM of a mother is the closest female ancestor

For the concept *mother* as a whole, the ICM will be a cluster of all these ICMs, that is, the mother that shares all these attributes – but for someone to qualify as a mother, only one of the definitions is enough.
is given to the slowest child. As for chess, although when chess players compete professionally, the ‘game’ is not amusement, it is still regarded as a highly-skilled version of the game of chess – they are ‘chess players’. And not finding chess ‘amusing’ is perhaps a subjective judgment; a search for ‘why play chess?’ on Google brings out the notion of ‘fun’ many times. Further research is required, but Wittgenstein’s specific analysis of game and the supposed counter-examples he gives is not very convincing to reject the idea of common features: at least in the light of the examples he gives, ‘rules’, ‘winning and losing’, ‘amusement’, appear to be shared features. These features appear even more clearly if we think about what the concept of game is contrasted with, in particular war (which brings out the notion of friendly competition) and sports (which is sometimes applied to chess, but then as a result of a different conceptualisation). This idea of limitations from the other nouns in the same field, taken from the ‘classical’ approach, perhaps tends to be too readily discarded.

Objection 3: addition of expected features: informants tend to propose, and regard as important, features that are expected, but not necessary; for instance, for vegetable, they will refer to meals (‘for first or main course of a meal’) and to taste (‘savoury’ – again, contrasting with other categories, such as fruit). These expected features are part of the semantic structure, as they have consequences on categorisation. For instance, many speakers will consider olives or tomatoes as vegetables rather than fruit because of their taste and of the way they are eaten. This suggests that the criteria used to assign an entity to a category may not be necessary and jointly sufficient features, but rather the result of a synthesis obtained from experience. Moreover, encyclopaedic knowledge cannot always be clearly dissociated from the meaning of the word. It could be argued against objection 3, at first sight, that some concepts are easy to define as a list of necessary and jointly sufficient features. One example is forest (sense 1: rather vast, area of land, trees on it / sense 2: group of trees, rather vast). But when asked ‘what is a forest?’, just as readily available are items of information related to experience of the five senses: smells, autumn colours, dead leaves on the ground, a path, the sunlight peering through, different heights of vegetation, etc. So the semantic structure that is abstracted from the examples met in the course of our experience is not just a series of defining features, but a series of recurring features, as well as processes (Lakoff’s ‘scripts’), etc., some of which we know or suppose to be necessary, others we regard as expected, others still are just possibilities. That is why for vegetable, reference to cooking or meals is deemed important: it corresponds to the fundamentals of our experience. In other words, it seems that encyclopaedic knowledge about the entities in the category cannot always be clearly distinguished from the meaning of the word.

For some categories, it is even impossible to abstract completely from the members. One case in point is furniture: a strictly theoretical definition such as (7) is incomplete (it would

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7 For instance, the Oxforddictionaries ‘explore’ section describes: ‘Is an olive a fruit? Ask a botanist, and the reply would be yes: an olive, just like a plum or a cherry, is a fruit. The olive is the small, bitter-tasting fruit of the olive tree, Olea europea. Olives are classified as fruit because they’re formed from the ovary of the olive flower, and they’re seed-bearing structures - those small stones (or pits) that you leave on the side of your plate could grow into trees if you planted them. In culinary terms, however, olives are like those other fruit, tomatoes, and are treated as a vegetable: we eat them in savoury dishes or on their own as a snack or hors d’oeuvre.’ (https://en.oxforddictionaries.com/explore/is-an-olive-a-fruit)
include a telephone, a lamp, etc.), while one that includes typical examples, such as (8), appears better.

(7) (OED 2017, definition of furniture – ‘prevailing sense’) Movable articles, whether useful or ornamental, in a dwelling-house, place of business, or public building. Formerly including also the fittings.

(8) (Oxforddictionaries.com, accessed 2017) The movable articles that are used to make a room or building suitable for living or working in, such as tables, chairs, or desks.

Again, a definitional approach gets better when the noun is contrasted with other nouns in the same field, such as fittings, appliances or furnishings. For instance, informants deemed a carpet a poor example of furniture (Rosch 1975, cited by Evans & Green 2006: 265), whereas if they had been offered a choice between furniture and furnishings, they would probably have found a carpet to be a good example of furnishings, rejecting perhaps as a result membership in the category of furniture.

Objection 4: the problem of conceptual fuzziness: while the ‘classical’ theory predicts sharp boundaries (either an element has the necessary and jointly sufficient features, and is a member of the category, or it lacks at least one defining feature, in which case it is not a member), prototype theory contends that boundaries are fuzzy, that is, that categorization is sometimes difficult or context-dependent. A typical example is Labov (1973)’s analysis of CUP vs. BOWL, showing the conflicting parameters in cases in which an entity fully fits neither set of defining features: when shown a small container without a handle, which contained soup, informants decided it was a ‘bowl’; but when the same container was shown with coffee in it, some of them decided it was a ‘cup’. Another element taken to be evidence of fuzzy boundaries is the use of hedges, such as ‘more or less’, ‘not really’ or ‘technically’. Croft & Cruse (2004: 94) also show how context may influence judgment, with the example of cyberpet: in (9a), categorisation as a pet is viewed as problematic, whereas in (9b), it is not:

(9) a. Is a cyberpet a real pet? (most informants will answer ‘No.’)
   b. I advise you to get her a kind of pet – even an electronic one might be beneficial.

The context influences the way we construe the category. For instance, I wish I could fly like a bird will exclude flightless birds.

In sum, the notion of fuzzy boundaries relies on the idea that ‘different speakers make different judgments under different contextual conditions’ (Croft & Cruse 2004: 95). This conclusion that category boundaries are fuzzy, however, has been challenged. First, Croft & Cruse (ibid.) suggest that despite different boundary settings in different contexts, one given context construes a sharp boundary. To them, a boundary is not fuzzy, because by definition, it is a line of demarcation between an ‘inside’ and an ‘outside’. Boundaries should not be considered out of context, but in context; this is a dynamic approach to semantic structure, as context activates certain domains, or certain features, only – such as flying for BIRD in I wish I could fly like a bird (this at least partly meets Lakoff’s analysis of MOTHER, with the notion of domains). A second argument is put forward by Mignot (2017: 80): assignment difficulties
are not due to fuzzy boundaries, but to the fact that the entities do not fully fit the categories. So the problem is the entities, not the boundaries. Hedges reflect this: if an entity is categorised as ‘a funny dog’, for instance, ‘funny’ precisely has to be added to the category DOG. So the boundaries of DOG are not themselves fuzzy.

Section 2 now turns to the notion of ‘prototype’, which was coined as a result of these objections.

2. Prototype approaches as an alternative to definitional structure

The different senses of the word ‘prototype’ reflect different conceptions of the semantic structure of concepts.

2.1. The ‘prototype-as-subcategory’ (Taylor 2003: 64) approach

2.1.1. Definitions of ‘prototype’:

There are two senses in this approach:

1. In the initial use by Rosch (1975), ‘the prototype’ of a category is the set of best examples:

   (10) (Rosch 1975: 193 – bold case added) [C]olor categories appear to be represented in cognition not as a set of criterial features with clear-cut boundaries but rather in terms of a prototype (the clearest cases, best examples) of the category, surrounded by other colors of decreasing similarity to the prototype and of decreasing degree of membership.

   In other words, there is one prototype (made up of several items) per category.

2. In later use: ‘a prototype’ is ‘a prototypical/good exemplar’, e.g. ‘Orange and apple for example are prototypes of the category fruit’ (Braun 1997: 19). So a category often has several prototypes. In the literature on GOE ratings, prototypes understood in this sense are not specific entities, but subcategories, kinds of entities. For instance, a terrier is a prototype of the category DOG (as are a collie, a spaniel, etc.), but my neighbour’s terrier is not (Taylor 2003: 64) – hence the term ‘exemplars’ rather than ‘examples’.

2.1.2. Relationship of this conception of prototypes to semantic structure

Rosch (1975)’s initial model, as it was interpreted (to some linguists, misinterpreted), regards prototypes as a representation of semantic structure: in that model, ‘prototypes constitute representations of categories’ (gloss by Lakoff 1987: 43), ‘the prototypical category member is the word’s meaning’ (gloss by Taylor 2008: 42). Membership is assigned on the basis of its similarity to the prototype, rather than on the basis of features; for instance, a given animal is said to be regarded as a bird on the basis of its similarity with robins and sparrows, etc. This initial model was criticised because a need was felt for a more abstract layer in the semantic structure, beyond the members.

8 Sometimes known as the ‘standard version’.
In revised analyses, whether by Rosch (1978) or others (e.g. Lakoff 1987), the semantic structure of the category is therefore augmented with a more abstract layer. The differences in GOE ratings are only regarded as ‘prototype effects’ (also known as ‘typicality effects’), in other words, as consequences of the semantic structure of the concept: ‘prototype effects do not necessarily imply a prototype structure, but only a structure which is able to generate prototype effects’ (gloss of Lakoff 1987 by Grabois 1999: 210).

For Rosch (1978), the abstract layer takes the form of (weighted) attributes. The prototypes are still the most representative members of the category, but with no status beyond that; they are the most representative only because they ‘exhibit a maximum number of attributes which are diagnostic of the category’, that is, they are most similar to all the other members – following the notion of family resemblance popularised by Wittgenstein, the diagnostic attributes do not have to be shared by all the members of the category (Taylor 2008: 44).

2.1.3. Personal assessment
The idea of a double layer (members and concept) appears very convincing. One question, though, is whether there are always prototypical members in the form of subcategories. Textbook examples only consider categories that allow for subdivisions into types (such as bird or furniture). But it is not always possible to subdivide a category into types. For instance, if asked to describe good examples (prototypes) of a forest, people will probably tend to describe characteristic features (e.g. a forest with dense trees, but where you can walk, with undergrowth) or give specific examples (e.g. the forest in a given film, or a forest that they have been to), rather than rely on types of entities. So considering that all ‘prototypes’/‘prototypical members’ should be subcategories appears to be a problem.

2.2. The ‘prototype-as-abstraction’ (Taylor 2003: 64) approach

In this sense, ‘A prototypical bird, for example, may best be understood in terms of a cluster of attributes which form a family resemblance.’ (Grabois 1999: 210, citing Aitchison 1994). The prototype is is no longer a subcategory of members, but a form of abstraction obtained by synthesis of the occurrences met in the course of experience:

(11) (Murphy 2004 [2002]: 30 – bold case added) Each category might have a most typical item – not necessarily one that was specifically learned, but perhaps an average or ideal example that people extract from seeing real examples. You might have an idea of the prototypical dog, for example, that is average-sized, dark in color, has medium-length fur, has a pointed nose and floppy ears, is a family pet, barks at

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9 A third view of ‘prototypes’ considers them as specific entities. This view is found in exemplar theories, which are contrasted with, rather than part of, prototype theory; as such, it will not be considered in this paper. In a nutshell, in exemplar theories, ‘concepts are represented as remembered category instances’ (Murphy 2016: 1035). In other words, the brain stores individual items, with no synthesis:
(a) (Cruse, entry ‘exemplar theory’ – bold case added) ‘a concept is represented not as a set of features (as in prototype theory) but as a collection of memory traces of individual examples. The centrality of an item, on this approach, is given by its overall similarity to the set of stored examples, and the prototype is the example with the greatest similarity to the largest number of examples.’
The notion that there is no abstraction from individual entities is rather counter-intuitive, but apparently, this approach fits experimental data at least as well as prototype theory.
strangers, drools unpleasantly, and has other common features of dogs. Yet, this prototype may be something that you have never specifically seen – it is just your abstraction of what dogs are most often like.

So this time, the prototype is part of the abstract layer.

This sense is found for instance in Langacker’s model of schematic networks; so we now consider the place of prototypes in this sense of the word) within his general model of semantic structure.

**Langacker’s description of the place of prototypes in semantic structure**

To Langacker (1987: 371), a prototype is an abstraction from the first common exemplars met in the course of early experience of the category. In that sense, a prototype is a ‘low-level schema’ of the concept, that is, the initial schema that a child will form of a category by abstraction of common elements, before conceptualisation gets complexified. For instance, the prototype of TREE probably includes foliage, a trunk, etc. It is the prototype in that it is ‘the starting point for the gradual evolution of a complex category’ (1987: 373).

Once a child comes across pine trees, for instance (which do not have foliage), the resulting semantic categorization will have to be adapted as follows:

(12) (Langacker 1987: 374) Tentative description of the semantic structure of TREE after the inclusion of pine trees

![Diagram](image)

Here is how Langacker describes the place of schemas and prototypes in the meaning of the noun:

(13) (ibid.) The meaning of tree for the child at this point is not just the schematic [TREE’], nor is it just the prototype [TREE]; rather its meaning is given by the entire schematic network, any node of which can be accessed by the phonological unit [tree].

Complexification of the semantic structure goes on like this as new types of trees (family tree, palm tree, etc.) require adaptations. The resulting network acts by extension from the

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10 *the strict criterial-attribute model, despite its dominance in the Western intellectual tradition, cannot be accepted unquestioningly as the basis for language structure and behavior. Two other models, more directly grounded in cognitive concerns, appear to offer more revelatory and empirically adequate accounts of linguistic categorization: the prototype model, and a model based on schematicity […] They are not fundamentally incompatible, and both prove essential for a reasonable description of natural language. What I therefore propose is a synthesis that treats them as special cases of a unified phenomenon and relates them in integral fashion to the network conception of complex categories.’ (Langacker 1987: 371)

11 A schema is ‘an abstract characterization that is fully compatible with all the members of the category it defines (so membership is not a matter of degree); it is an integrated structure that embodies the commonality of its members.’ (Langacker 1987: 371)
prototype (which is salient because it abstracts from typical instances of the category) or from
the schematic representation for a given domain (one of the rectangles to the left), yielding
something like (14):

(14) Semantic structure of part of the categories TREE after several phases of
complexification (Langacker 1987: 374):

To take another example: the prototype of a RING is a circular object (Langacker 2006
[1990]: 31). After complexification, we get something like:

(15)

The overall network forms the ‘schematic network’ of the category. Is there a top schema
for the category, as suggested in (14) in the form of [TREE’]? Not for all categories: RING
does not have one in (15), and the idea of a higher-order schema is in any case a conjecture
(Langacker 1987: 377). Similarly, ‘not every lexical category has a single, clearly determined
prototype’ (Langacker 2006 [1990]: 30). What matters in the idea of schematic network is the
principle of dynamic construction and evolution of the semantic structure over time, and the
notion that ‘[t]he conventional meaning of a category must be equaled with the entire
network, not with any single node’ (Langacker 2006 [1990]: 31).

Moreover, ‘[S]emantic structures (which I call ‘predications’) are characterized relative to
‘cognitive domains’ (Langacker 2006 [1990]: 30-33). For instance, defining a knife involves
shape specification, canonical role in cutting, information such as the existence of knives
among silverware, or knife-throwing acts in circuses. Not all the specifications have the same
degree of centrality, that is, the same likelihood of activation when the noun is used. But they
are part of the semantic structure of the concept.

**Conclusion**

This overview has established three different senses for the word ‘prototype’:

1) (Rosch’s initial model) the prototype of a category is the set of best exemplars; category
   membership decisions are based on this set. This is not enough: further abstraction is
   required.

2) (e.g. Rosch’s revised version) a prototype is a typical exemplar of a category, in the form
   of a subcategory. A category therefore has a double layer, with members vs. an abstract
   layer (concept). The abstract layer may take the form of (weighted) attributes. – This was
found to be more satisfactory, but there may not always be subcategories (see forest), and
the description does not take contextual construal into account (static approach).

3) the prototype of a category is an abstraction from recurring features among the members.
So it is part of the abstract layer. In Langacker’s model, the prototype is more specifically
the initial typical representation abstracted from experience; the layer of meaning is then
complexified in the course of experience, and takes the form of a network, to be understood
against several domains. Activation of features in discourse depends partly on the domain
(see also Lakoff’s description of MOTHER) and more generally on the context.

What progress does the notion of ‘prototype’ bring to the understanding of the semantic
structure of concepts?

1) unlike the classical view, it takes into account the cognitive reality of category acquisition
and storage: the role of experience from the five senses, the gradual complexification of the
semantic structure, activation of certain parts only depending on the context. Sets of defining
(that is, necessary and jointly sufficient) features may be obtained through conscious
comparison between the nouns of a semantic field, or for dictionary definitions, but they do
not correspond to natural conceptualisation, which is based on abstraction from experience.

2) the notion of organising centre as opposed to a periphery is essential to the understanding
of category structure. This idea was also put forward by Culioli with the concept of
attracteur, which he translates into English as ‘an organising centre (prototype)’ (1990: 70).
The notion of ‘domain’, too, is central.

There are still grey areas in the understanding of semantic structure, though. Among them
are the following:

1) textbook accounts tend to underplay the complexity of interrelated senses, even within very
common categories, all the more so as GOE ratings are based on out-of-context tasks.

2) textbook accounts suggest that all categories have prototypes, but this universality is
questioned by some linguists. As we saw, Langacker (2006 [1990]: 30) suggests that a
single, clear prototype (in sense 3: a typical representation abstracted from experience) may
not be found in all concepts; prototypes in the sense of ‘prototypical subcategories’ may not
be universal either (cf. forest). Moreover, it has been suggested that there may not be any
prototypical members at all when people do not have central views about categories: e.g. the
category CHAUCER’S GRANDMOTHERS (Fodor 1981: 297), or the following (Laurence &
Margolis 1999: 36):
• very heterogeneous categories such as THINGS THAT WEIGH MORE THAN A GRAM;
• others, for instance A DON DE LILLO BOOK.

Laurence & Margolis (1999: 36) therefore conclude: ‘It would seem, then, that concept
possession (= possessing a concept) doesn’t require a representation with prototype
structure.’ The examples given by the few linguists who mention these problems are always,
like here, examples of compound categories; but it seems that the same could be said about
GRAM, for instance.

3) More generally, textbook accounts suggest that all categories should be treated in the same
way. But this might be a simplistic view (see Langacker’s tree vs. ring). For instance, GRAM
may not have prototype structure. About the artificial category EVEN NUMBER, we saw that 8
is considered a better example than 10,002; but this asymmetry is not a consequence of the
meaning, or even of the semantic structure perhaps, of ‘even number’. This may just have to
do with the fact that we deal with small numbers better than big numbers. ‘Better example’ here does not mean ‘more representative’, but ‘one we feel more comfortable with’. This is different from saying that a penguin is not as good an example of a *bird* than a robin. Another difference is that some categories do not subdivide into subcategories, so may not have the same structure. Finally, some categories make it easy to draw what might be thought to be defining features, whereas for others, such as *vegetable*, it seems difficult to abstract away from the members completely, at least for the average speaker (as opposed to the botanical expert).

**References**


