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A Few Remarks on Prototype Theory in Cognitive Linguistics

Zarys teorii prototypu w językoznawstwie kognitywnym

Abstract

The purpose of the present paper is to demonstrate both the historical background of the prototype theory and its definitional problems. It presents two fundamental tenets of cognitive linguistics and the origin of prototype theory. Eleonor Rosch introduced her theory (1975) in order to explain how semantic categories are perceived by our mind.

Key words: *prototype, cognitive linguistics, theory, categorization, fuzziness.*

Abstrakt

Celem tej pracy jest prezentacja rysu historycznego teorii kategoryzacji oraz problemów związanych z ustaleniem jej definicji. Ta praca przedstawia dwa podstawowe założenia teorii kategoryzacji i początki tej teorii. Eleonor Rosch wprowadziła tę teorię w 1975 w celu przedstawienia jak umysł ludzki postrzega kategorie semantyczne.

Słowa kluczowe: *prototyp, lingwistyka kognitywna, teoria, kategoryzacja, niejasność.*

Cognitive linguistics – historical context

Cognitive linguistics is viewed as a recent linguistic theory, dating back to 1987. The books which are considered its foundation were published that year and they are 'Women, Fire and Dangerous Things' (Lakoff, 1987), 'Foundations of Cognitive Grammar' (Langacker, 1987) and 'The Body in the Mind' (Johnson, 1987). In 1989 the International Cognitive Linguistics Association (ICLA) was created and in 1990 both the first journal 'Cognitive Linguistics' (Mouton de Gruyter) was published and the First Cognitive Linguistics Conference took place.

Cognitive linguistics originated as a reaction against generative approaches to language. Previously, generative tradition by Chomsky had viewed language as a set of strong commitments to syntax, ignoring the role of semantics and pragmatics in linguistics. Many authors regarded this attitude as inappropriate: (...) meaning is what language is all about; the analyst who ignores it to concentrate solely on matters of form severely impoverishes the natural and necessary subject matter of the discipline and ultimately distorts the character of the phenomena described. (Langacker, 1987, p. 12)

What is more, the generative assumption of innate structures for grammar and language (universal grammar) and the assumption of linguistic knowledge being isolated from cognitive faculties seemed also very controversial. They resulted in the perception of syntax as autonomous and language as modular, consequently, the language was processed in an encapsulated manner thanks to a specialized brain module. Cognitive linguistics, on the other hand, is based on two fundamental tenets, i.e. non-modularism and non-objectivist's view of linguistic meaning. The first tenet refers to the status of language as a human ability. In cognitive linguistics the ability to use one's mother tongue is not due to a unique faculty or a special innate module, not connected with other cognitive abilities. Among the most eager advocates of modularism are Chomsky (1986, p. 18), Fodor (1983) and Jackendoff (1996, p. 96). Whereas, non-modularism is supported thanks to research in anthropological linguistics, cognitive psychology, cultural anthropology, evolutionary biology and neurophysiology. The research was carried out by Berlin and Kay (1969), Heider and Olivier (1972), Rosch (1973, 1977, 1978), Rosch and Mervis (1975), Kempton (1981) and Deacon (1997). This view claims that language faculty is a product of general cognitive abilities such as kinesthetic abilities, visual skills, and human categorization strategies. Embodiment is perceived as a keyword in cognitive linguistics. Human beings create and understand their categories on the basis of their experien-

ce and they are not abstract or human independent. (Johnson, 1987; Lakoff, 1987) Human conceptual categories at any level are not a mixture of a set of universal abstract features. Their meanings and structures are triggered by experience, which is very often bodily experience.

The second tenet concentrates on the theory of linguistic meaning. According to cognitive linguistics, meanings cannot function independently from their creators and users. There is no objective reality which can function independently from human cognition. Fillmore, Lakoff and Langacker claim (Ungerer, Schmidt, 1996, p. 208-209) that linguistic forms are like 'blueprints' which trigger their conceptual structures being formed in our brains, but showing no inherent meanings in themselves. Meanings exist in our minds and are activated by linguistic forms. Lakoff (1987, p. 583) says that the primary function of language is to convey meaning. A grammar should therefore show, as directly as possible, how parameters of form are linked to parameters of meaning.

The origin of prototype theory

The prototypical theory is summarized in the following statement:

> When describing categories analytically, most traditions of thought have treated category membership as a digital, all-or-none phenomenon. That is, much work in philosophy, psychology, linguistics, and anthropology assumes that categories are logical bounded entities, membership in which is defined by an item's possession of a simple set of criterial features, in which all instances possessing the criterial attributes have a full and equal degree of membership. In contrast it has recently been argued ... that some natural categories are analog and must be represented logically in a manner which reflects their analog structure. (Rosch, 1975, p. 573-574)

The theory dates back to the mid 1970's when Eleanor Rosch did research into the internal structure of categories. Prototype theory from a psycholinguistic perspective can be perceived in two ways. On the one hand, Rosch's ideas were useful for psycholexicology. On the other hand, the theory of prototypicality has played a major role in linguistics since the early 1980s, which can be corroborated by a great number of monographs and collective volumes. (Wierzbicka, 1985; Lakoff, 1987; Langacker, 1987; Craig, 1986; Rudzka-Ostyn, 1988; Lechmann, 1988; Taylor, 1989)

What is more, prototype view is a result of cognitive psychology in the 1970's thanks to the ground breaking research by Rosch on the internal structure of categories. (Murphy, 2002; Geeraerts, 1989) Its existence was triggered by a great dissatisfaction of the cognitive linguistics of classical theory of necessary and sufficient conditions of a category. Classical theory known since Aristotelian times regarded as insufficient for adequately explaining the human categorization system (since it explained categorization only through necessary and sufficient conditions) was replaced by the prototype theory. The weakness of the classical theory is its conceptual fuzziness. The classical theory "permits only two degrees of membership, i.e. member and non-member". (Taylor, 1990) However, in linguistics there are instances where it is impossible to decide whether a given entity is a member of a certain category or not. This is the point where the prototype theory takes its floor. A prototype is perceived as the concrete typical instance of its class corroborated by people's judgements of rightness of membership in a category. It is characterized by having more common features than other members of the same class. There are some basic ideas concerning the prototype theory. One of them is that the members of a category share some common features and they gather around the prototype. Another is, the members of a category may possess various number of attributes. Some of them contain one attribute and become more peripheral while those with a few common features become central. The next idea covers fuzziness of boundaries, i.e. peripheral members represent attributes shared by various prototypes making them non-typical members difficult to be classified to one category.

Additionally, the membership depends on people's minds, various social and cultural contexts together with knowledge may influence their membership. Not to mention the historical and geographical aspects/backgrounds which determine the idea of a prototype.

The authors Wittgenstein (1953), Hersch and Caramazza (1976), Kintsch (1974), Rosch (1973) perceive natural categories as vague or fuzzy sets (Zadeh,1965) and claim that membership is a question of degree rather than all-or-none. 'Diamond' is highly typical for the category 'stone', however, 'zircon' has a lower degree of membership and if we take an object not related to the category like 'paper', it exhibits zero degree of membership in this category. The fuzziness of categories constitutes important implications in concept formation and semantic memory. Rosch verified through speeded verification tasks the typicality of different members of a category. 'Specifically, true category membership statements involving highly typical category exemplars (e.g. A robin is a bird) are verified more quickly than statements

involving less typical exemplars (e.g. A chicken is a bird). (McCloskey & Glucksberg, 1978, p. 462)

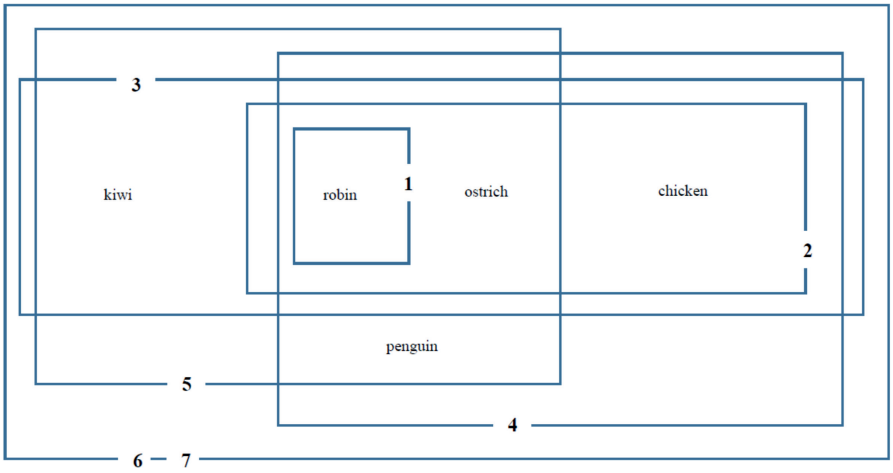

Figure 1: A definitional analysis of *bird*
1. Being able to fly 2. Having feathers 3. Being S-shaped 4. Having wings 5. Not domesticated 6. Being born from eggs 7. Having a beak or bill (Geeraerts, 2016, p. 10)

Oden (1977) revealed that the reliability of people's judgements concerning the truth value of category membership and his findings show that the sentence *'A robin is a bird'* is truer than the statement *'A pelican is a bird'*. Natural categories exhibit an internal structure which is said to be strictly associated with typicality or degree of membership, which corroborates the fuzzy category hypothesis.

Lakoff (1987) suggests three levels of categorization: basic, superordinate and subordinate level. The basic level categorization comprises basic perception which is not too abstract or too concrete, offering relevant information about the objects and organisms of the world. The superordinate categorization refers to more abstract and general categories while the subordinate categorization deals with concrete and specific categories. The word *'bird'* is an example of a basic level category, *'animal'* is superordinate to it, while *'sparrow'* is subordinate to it.

> First, the basic level categories have the common gestalt, a large number of category-wide attributes, the prototype structure,

> the natural access to the world, and linguistic forms are short and monomorphemic words. Second, the superordinate level categories have no common gestalt, one or very few category-wide attributes and the salient general attributes, the family resemblance structure, the highlighting and collecting function, and linguistic forms are often longer and morphologically complex words. Third, the subordinate level categories have almost the identical gestalt, a large number of category-wide attributes and the salient specific attributes, the high degree of homogeneity among category members, the specifying function, and linguistic forms are often morphologically complex words. (Zhang, 2017, p. 135)

Prototypicality – definitional problems

Longman Dictionary of Language Teaching and Applied Linguistics (2003, p. 432) defines the term 'prototype' as 'a person or object which is considered by many people to be typical of its class or group'. Rosch (1975, p. 194) states that the prototype consists of a set of prototypical features, which are the attributes that are shared by most members. She defines it as 'the clearest case of a category', whereas, a category is presented as 'a set of attributes that we consider characteristic of groups of people or objects' or 'a number of objects that are considered equivalent'. It is said that mental representation of a prototype is created on the basis of several factors, among which we may enumerate: appearance, usage and frequency. These features stimulate people's judgements of typical instances of a given category. What is more, Aitchinson (1987) presents two types of attributes which can be applied to define a category. These are 'identification criteria' and 'stored knowledge', they can be explained as the attributes that are basic and necessary to identify a concept and the ones which we prescribe to objects thanks to the world of knowledge. For example, 'a bat' when judged on the basis of its appearance and its movement can be classified as 'a bird', however, on the basis of stored knowledge it is categorised as 'a mammal'.

The exact definition of prototypicality is not without problems. Posner (1986, p.55) suggests that a prototypicality is itself a prototypical concept. There are four basic features of prototypicality:

1. We cannot define prototypical categories using a set of criterial (necessary and sufficient) attributes.

   > We have argued that many words (...) have as their meanings not a list of necessary and sufficient conditions that a thing or

event must satisfy to count as a member of a category denoted by the word, but rather a psychological object or process which we have called a prototype. (Coleman and Kay, 1981, p. 43)

2. Prototypical categories manifest a family resemblance structure, their semantic structure is represented by a set of overlapping meanings. (Geeraerts, 2016, p. 5)

   The purpose of the present research was to explore one of the major structural principles which, we believe, may govern the formation of the prototype structure of sematic categories. This principle was first suggested in philosophy; Wittgenstein (1953) argued that the referents of a word need not have common elements to be understood and used in the normal functioning of language. He suggested that, rather, a family resemblance might be what linked the various referents of a word. A family resemblance relationship takes the form AB, BC, CD, DE. That is, each item has at least one, and probably several, elements in common with one or more items, but no, or few, elements are common to all items. (Rosch, 1975, p. 574-575)

3. Prototypes display degrees of category membership.

   By prototypes of categories we have generally meant the clearest cases of category membership defined operationally by people's judgements of goodness of membership in the category (...) we can judge how clear a case of something is and deal with categories on the basis of clear cases in the total absence of information about boundaries. (Rosch, 1978, p. 36)

4. Prototypical categories are not clearly clarified at the edges.

   New trends in categorization research have brought into investigation and debate some of the major issues in conception and learning whose solution had been unquestioned in earlier approaches. Empirical findings have established that (...) category boundaries are not necessarily definite. (Mervis & Rosch, 1981, p. 109)

Let us take the concept 'bird' into consideration, which shows that natural categories may exhibit clear-cut boundaries. It is easy to differentiate

between a bird and non-bird. For example, we realise that a 'bat' is not a bird but a 'penguin' is. However, if we compared a bird with a SF creature that looks like a bird and talks like a man, we would have problems with finding the category for this feature, namely, a boundary problem arises.

The fuzziness of category membership may also be observed in colour terms, i.e. it is not easy to draw the boundary in the spectrum where red stops and orange begins. What is more, in psychological representation colours may be viewed through focalisation which, in turn, means that some hues of red are perceived as better than others. (Heider, 1972; Heider, Olivier, 1972)

Additionally, it is worth noticing that many words lose their prototypical meaning when used in various fixed phrases and idioms. The word 'head' , for example, prototypically means 'part of the body'. However, when we analyse the word 'head' in the following sentences, we notice that it loses its prototypical meaning completely or to some extent.

> The old man is holding the *head* of the walking stick tightly. (the top part)
> The *heads* of our company attended the forum. (the chief person of an organisation)
> Don't give up, use your *heads*! (intelligence)
> Where is the *head* on this ship? (toilet on a ship)
> A *head* picked a fight during the match. (a fan)
> There is a beautiful view from the *head* land. (geographical term)
> The *head* on my beer is small. (part of liquid)
> Usually the *head* of the river is in the mountains. (the starting point)

When we study any language, we memorize prototypical meanings first. Meanings derived from prototypical examples are always more difficult to be mastered. Consequently, once we know prototypical meanings, it is easier to deduce peripheral meanings.

Difficulties in defining prototypicality can be observed thanks to the following research on typicality of category members.

Animal Category

Candidate exemplar	Typicality
Dog	10.00
Horse	9.83
Cow	9.75

Bird Category

Candidate exemplar	Typicality
Robin	10.00
Sparrow	9.96
Eagle	9.58

Sparrow	7.50	Owl	8.71
Cobra	6.75	Vulture	8.38
Trout	6.66	Goose	8.29
Lizard	6.50	Duck	8.25
Unicorn	6.14	Condor	8.23
Lobster	6.13	Turkey	7.92
Jellyfish	5.92	Chicken	7.75
Woman	5.54	Penguin	6.96
Worm	5.30	Bat	3.63
Tadpole	5.21	Bee	2.04
Spider	5.16		
Mosquito	4.92		
Amoeba	4.21		

(McCloskey & Glucksberg, 1978, p. 467)

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