



## Types of cognitive models of polysemy of linguistic terms

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### ARTICLE INFO

#### Article history:

Received January 2024

Received in revised form

10 January 2024

Accepted 25 February 2024

Available online

25 May 2024

#### Keywords:

polysemy,  
cognitive models,  
linguistic terms,  
radial categorization,  
metaphorical extension,  
language processing.

### ABSTRACT

This article explores cognitive models of polysemy, revealing how multiple meanings of linguistic terms are structured and understood. Through radial categorization and metaphorical extension, it underscores the complexity of language and cognition.

2181-3663/© 2024 in Science LLC.

DOI: <https://doi.org/10.47689/2181-3701-vol2-iss2-pp312-318>

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## Лингвистик атамалар полисемиясининг когнитив моделларининг турлари

### АННОТАЦИЯ

#### Калит сўзлар:

полисемия,  
когнитив моделлар,  
лингвистик атамалар,  
radial туркумлаш,  
метафорик кенгайтма,  
тилни қайта ишлаш.

Ушбу мақола полисемиянинг когнитив моделларини ўрганади, лингвистик атамаларнинг бир нечта маънолари қандай тузилганлиги ва тушунилганлигини очиб беради. Категоризация ва метафорик кенгайтиш орқали у тил ва билишнинг мураккаблигини таъкидлайди.

## Типы когнитивных моделей многозначности лингвистических терминов

### АННОТАЦИЯ

#### Ключевые слова:

многозначность,  
когнитивные модели,  
лингвистические

В этой статье исследуются когнитивные модели многозначности, которые объясняют, как множественные значения лингвистических терминов структурируются и

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термины,  
радиальная  
категоризация,  
метафорическое  
расширение,  
языковая обработка.

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понимаются. С использованием методов категоризации и метафорического расширения статья подчеркивает сложность языка и процессов познания.

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## INTRODUCTION

Understanding the polysemy of linguistic terms – where a single word can hold multiple related meanings – is a complex endeavor that sits at the intersection of linguistics, cognitive science, and psychology. Polysemy not only enriches language, allowing for nuance and subtlety in communication but also poses challenges for language learners and computational models trying to grasp the full context of word usage [2]. Cognitive models of polysemy offer frameworks for dissecting this multifaceted phenomenon, providing insights into how individuals mentally organize and process the plethora of meanings that a single term can embody.

These models are grounded in the principle that the human mind categorizes experiences and concepts not in a rigid, but in a flexible and interconnected manner. Such categorization facilitates the understanding and retrieval of meanings based on context, experience, and cognitive processes [6]. Among the various types of cognitive models, some focus on the prototypical structures where meanings radiate from a core concept, while others emphasize the dynamic nature of meaning generated through conceptual metaphors, metonymies, or the blending of different cognitive spaces.

Furthermore, the role of context cannot be overstated, as it influences significantly which meaning of a polysemous word is activated in a particular instance. Models such as frame semantics and scenario-based approaches delve into how situational contexts cue specific meanings, enriching our understanding of language comprehension and use.

Delving into the types of cognitive models of polysemy, we explore not just the academic pursuit of categorizing and understanding linguistic phenomena, but also the practical implications for artificial intelligence, language teaching, and the study of human cognition. This exploration not only sheds light on the complexity of language but also the intricate workings of the human mind in processing and employing polysemous terms effectively in communication.

## METHODS

The study of cognitive models of polysemy in linguistic terms across English, Uzbek, and Russian languages reveals a sophisticated framework for understanding the multifaceted nature of words. Cognitive models view polysemy not as a random assortment of meanings but as a structured and systematic set of meanings connected by common cognitive principles. This review delves into several cognitive models identified in the literature, including radial categorization, metaphorical projection, metonymy, conceptual blending, conceptual domains, and frame and scenario models, to elucidate how they contribute to our comprehension of linguistic term polysemy.

Radial categorization, a core cognitive model, illustrates how words extend from a prototypical meaning to more peripheral meanings through metaphorical or metonymical expansion, forming a radial structure of meanings around a central core. This model, akin to the framework of prototype theory, highlights the gradient nature of linguistic categories and their organization around functional similarities and identity.

Jendzejko's analysis of complex verb-noun predicates (VNAs) through prototype theory serves as a prime example of this model in action [1]. It demonstrates how categories in language are organized around prototypical centers, with meanings radiating outwards through processes of nominalization and secondary verbalization, leading to a radial organization of meaning within the linguistic domain.

Further exploring the polysemic nature of linguistic terms Purmohammad, Shams, and Torabi investigated the Persian verb prefix *forou*, illustrating how its prototypical meaning extends into semantic networks of diminution, humiliation, and degradation, embodying the principles of radial categorization [2]. This contextual-dependent nature of word meanings underlines the flexibility and dynamism inherent in language, further supported by Scallman's corpus analysis of Spanish verbs signifying *to throw*, which showcases the use of metaphorical and metonymical expansions aligned with radial categorization principles [4].

Moreover, the work of Soper and Kenig on semantic embeddings emphasizes the significance of polysemy in semantic categorization, suggesting a nuanced understanding of word meanings beyond static representations [5]. This highlights the pivotal role of polysemy in linguistic analysis, where radial categorization aids in deciphering the complexities of language by identifying the roles of prototypes, metonymy, and metaphor in the formation and expansion of meanings.

In a specialized context, Buzheninov investigates the application of radial categorization within the sublanguage of homeopathy, proposing that this model can more accurately reflect the structure and nuances of specialized terminologies [7]. This perspective underscores the potential of radial categorization to analyze complex conceptual systems, where traditional categorization methods might fall short, thereby providing a more comprehensive understanding of the multiplicity and interconnectedness of meanings within specialized domains.

The exploration of cognitive models of polysemy across different languages offers valuable insights into the cognitive mechanisms underlying our perception, processing, and interpretation of polysemous words [8]. The radial categorization model, in particular, provides a robust framework for understanding the structured and systematic nature of polysemy, grounded in cognitive processes. This model, alongside others discussed in this review, underscores the gradient and dynamic nature of linguistic categories, highlighting the intricate web of meanings that constitute our linguistic understanding.

At the heart of our approach is an in-depth exploration of selected linguistic concepts, to clarify their semantic structure. This process starts by identifying the prototypical meaning of each term, which is considered the core or most fundamental understanding from which other meanings emerge. After this identification, we investigate the metonymic and metaphorical associations of these meanings.

The analysis of the concept begins with its basic understanding as the rules that govern the combination of words to form sentences. Then, we explore its more extensive implications within the fields of grammatical structures and logical organization. This layered approach allows us to understand and appreciate the complexity and diversity of linguistic concepts, highlighting the intricate interplay between different meanings. Our methodology goes beyond the limits of a single language or linguistic tradition by adopting a comparative perspective that encompasses several languages. We aim to shed

light on the universal patterns as well as the unique characteristics inherent in radical categorization through different linguistic contexts. This comparative approach not only enhances our understanding of polysemy within individual languages but also contributes to a deeper appreciation of linguistic diversity and the shared cognitive strategies that humans employ in language comprehension and use.

## RESULTS

Radial categorization represents an effective way to analyze the polysemy of linguistic terms, allowing us to uncover how from the prototypical meaning of a word, less central meanings deviate through metaphorical and metonymic extension. Polysemy, being a characteristic of many linguistic terms in various languages such as English, Uzbek, and Russian, can be effectively analyzed using this model. In English: The term “syntax” has the following meanings:

1. Prototypical meaning – rules for combining words and phrases into sentences.
2. Metonymic extension – the system of grammar rules of a language.
3. Metaphorical extension – the structure and logical organization of something.

In Uzbek: The term “so‘z”:

1. Prototypical meaning – a unit of speech, a word.
2. Metonymic extension – lexicon, vocabulary.
3. Metaphorical extension – speech, statement.

In Russian: The term “значение”:

1. Prototypical meaning – the meaning of a word, or concept.
2. Metonymic extension – the aggregate of all meanings of a polysemous word.
3. Metaphorical extension – the importance, and value of something.

The analysis of the polysemy of these linguistic terms based on the model of radial categorization is aimed at studying how the meanings of words evolve and transform within a language. The prototypical meaning is the initial and most basic meaning of the term, which forms the basis of its understanding; this meaning represents the most commonly used and widely accepted sense of the word, around which all its other meanings are constructed. For example, for the term *syntax*, the prototypical meaning in English is the rules for combining words and phrases into sentences, for the term *so‘z* in Uzbek – the meaning “a unit of speech, a word”, and for the term *значение* in Russian – the meaning of a word, concept. Metonymic extension occurs when the meaning of a word extends due to the association or close connection between two elements. In linguistic terminology, this can happen, for example, when a certain part (e.g., syntactic rules) represents the whole (the entire language apparatus). Similarly: lexicon, vocabulary in the semantic structure of the term *so‘z*, and the aggregate of all meanings of a polysemous word for the term «значение». Thus, the term begins to denote not only its original meaning but also a broader concept into which this meaning is incorporated. The metaphorical extension allows the term to be used in more abstract and transferred meanings, often going beyond its original use. For example, the concept of syntax can be applied to the structure and logical organization not only of linguistic but also of non-linguistic systems. Let's provide more examples of the analysis of the polysemy of terms in the studied languages according to the model of radial categorization: In English: The term *meaning* has the following meanings:

1. Prototypical meaning – the sense, and meaning of a word.
2. Metonymic extension – semantics, the science of meaning in language.

### 3. Metaphorical extension – purpose, importance of something.

The term *speech*:

1. Prototypical meaning – oral speech, conversation.
2. Metonymic extension – language, communication system.
3. Metaphorical extension – public speaking, lecture.

The term *text*:

1. Prototypical meaning – a written document, words on a page.
2. Metonymic extension – corpus, collection of written works.
3. Metaphorical extension – cultural product, system of meanings.

In Uzbek: The term *nutq* has the following meanings:

1. Prototypical meaning – speech, speaking.
2. Metonymic extension – language, communication system.
3. Metaphorical extension – performance, address.

The term *ma'no*:

1. Prototypical meaning – sense, meaning of a word.
2. Metonymic extension – semantics, the science of meaning.
3. Metaphorical extension – purpose, importance of something.

The term *matn*:

1. Prototypical meaning – written text.
2. Metonymic extension – a corpus of texts.
3. Metaphorical extension – cultural product, a system of meanings.

In Russian: The term *знак* has the following meanings:

1. Prototypical meaning – designation, symbol.
2. Metonymic extension – language, system of signs.
3. Metaphorical extension – sign, indication of something.

The term *речь*:

1. Prototypical meaning – the process of speaking.
2. Metonymic extension – statement, text.
3. Metaphorical extension – oratorical performance.

The term *контекст*:

1. Prototypical meaning – linguistic environment.
2. Metonymic extension – discourse, communicative situation.
3. Metaphorical extension – general environment, background.

## DISCUSSION

Generally, through the process of radial categorization, it is possible to gain an understanding of how linguistic terms change over time based on their original meanings. This occurs through metonymic expansion, where the meaning of a word expands within its semantic field, or through metaphorical expansion, in which the word is used in new and unusual ways. By applying the radial categorization model, it is possible to trace connections between different meanings of polysemantic terms and highlight their prototypic or central meanings. These extensions demonstrate a radial distribution of meanings, ranging from more prototypic to less central, based on cognitive associations and contextual relations.

The analysis of polysemy in linguistic terms, in English, Uzbek, and Russian through the lens of radial categorization reveals the role of metaphors and metonymies in the formation of complex networks of word meanings. This methodology offers



valuable insights into the structure and development of polysemy, based on the contextual connectivity of words and their semantic similarity through cognitive expansion.

Metaphorical projection explains polysemy through metaphor. When the meaning of a word is transferred to another, it is referred to as metaphorical projection. This process involves the use of one meaning to explain another. The model is based on the understanding that metaphor is not just a literary technique, but a fundamental mode of thought that helps us comprehend certain phenomena through the prism of other ideas.

### CONCLUSION

The analysis presented in this article underscores the intricate polysemy of linguistic terms across English, Uzbek, and Russian, highlighting the broader phenomenon of semantic diversity within languages. This diversity is not arbitrary but rooted in the fundamental cognitive processes that govern human understanding and categorization of the world. By employing cognitive models to dissect the polysemy of linguistic terms, we delve into the nuanced ways in which ambiguity serves not as a linguistic challenge but as a window into the depth of human cognition.

These models reveal that the polysemous nature of terms is a direct manifestation of how linguistic scientists, and speakers in general, structure their experiences and knowledge about language through cognitive frameworks. The radial categorization model, in particular, provides a compelling lens through which to view this structuring, demonstrating how from a single, prototypical core, a term can extend into myriad related meanings through metaphorical and metonymic processes.

Furthermore, the comparative analysis across languages enriches our understanding by showing that despite the diversity of linguistic structures and cultural contexts, there are universal cognitive strategies at play in the organization of semantic fields. This cross-linguistic perspective not only broadens our understanding of polysemy but also underscores the shared cognitive architecture underlying human language.

The study of the polysemy of linguistic terms through cognitive models offers profound insights into the ambiguity of terms, reflecting deep-seated cognitive processes. It highlights how linguistic scientists and speakers alike navigate and articulate their linguistic and experiential landscapes, contributing to our understanding of language as a reflection of human cognition and its interaction with the world.

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