

## LEXICAL-SEMANTICS: THEMATIC ROLES

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**Annotation:** *This thesis examines lexical semantics with a focus on thematic roles. It outlines lexical units, their semantic relations, and the ways meaning is structured and interpreted in language. Special attention is given to how thematic roles represent participants in events and their significance in both linguistic theory and computational applications.*

**Key words:** *lexical semantics, lexical units, semantic relations, thematic roles, agent, theme, instrument, syntax-semantics interface*

Lexical semantics is concerned with the decomposition and classification of lexical items; lexical semantic structure differences and similarities cross-linguistically; the connection between lexical meaning and sentence structure.

Lexical units, also known as syntactic atoms, can either stand alone, as in root words or portions of compound words, or must attach to other units, as prefixes and suffixes do. The former are known as free morphemes, whereas the latter are known as bound morphemes.<sup>1</sup> They have a limited range of meanings (semantic fields) and can be combined to produce new denotations.

Lexical elements form predictable patterns of association with one another. Hyponymy, hypernymy, synonymy, antonymy, and homonymy are examples of lexical item relationships.<sup>2</sup>

Hyponymy and hypernymy refers to a relationship between a general term and the more specific terms that fall under the category of the general term. For example, the colors *red, green, blue* and *yellow* are hyponyms. They fall under the general term of *color*, which is the hypernym. Taxonomy showing the hypernym "color", ex. *Color (hypernym) → red, green, yellow, blue (hyponyms)*. Hyponyms and hypernyms can be described by using a taxonomy, as seen in the example.

Synonymy refers to words that are pronounced and spelled differently but contain the same meaning. Ex. *Happy, joyful, glad*

Antonymy refers to words that are related by having the opposite meanings to each other. There are three types of antonyms: graded antonyms, complementary antonyms, and relational antonyms. Ex. *dead, alive, or long, short*

Homonymy refers to the relationship between words that are spelled or pronounced the same way but hold different meanings. Ex. *bank (of river) bank (financial institution)*

Polysemy refers to a word having two or more related meanings. Ex. *bright (shining), bright (intelligent)*.<sup>3</sup>

<sup>1</sup> [https://en.wikipedia.org/wiki/Lexical\\_semantics](https://en.wikipedia.org/wiki/Lexical_semantics) Murojaat sanasi (27.09.2025)

<sup>2</sup> Loos, Eugene; Anderson, Susan; H. Day, Jr., Dwight; Jordan, Paul; Wingate, J. Douglas. "What is a lexical relation?". Glossary of linguistic terms. *LinguaLinks*.

<sup>3</sup> [https://en.wikipedia.org/wiki/Lexical\\_semantics#Semantic\\_networks](https://en.wikipedia.org/wiki/Lexical_semantics#Semantic_networks) Murojaat sanasi (27.09.2025)

**Thematic roles** are one attempt to capture this semantic commonality between *Breakers* and *Eaters*. The subjects of both these verbs are agents. Thus AGENT is the thematic role which represents an abstract idea such as volitional causation. Similarly, the direct objects of both these verbs, the *Broken Thing* and *Opened Thing*, are both prototypically inanimate objects which are affected in some way by the action. The thematic role for these participants is theme.

Thematic roles are one of the oldest linguistic models, proposed first by the Indian grammarian Panini sometime between the 7th and 4th centuries BCE. Their modern formulation is due to Fillmore<sup>4</sup> and Gruber<sup>5</sup>. Although there is no universally agreed-upon set of thematic roles, following examples present a list of some thematic roles which have been used in various computational papers, together with rough definitions and examples:

AGENT - The volitional causer of an event

EXPERIENCER - The experiencer of an event

FORCE - The non-volitional causer of the event

THEME - The participant most directly affected by an event

RESULT - The end product of an event

CONTENT - The proposition or content of a propositional event

INSTRUMENT - An instrument used in an event

BENEFICIARY - The beneficiary of an event

SOURCE - The origin of the object of a transfer event

GOAL - The destination of an object of a transfer event

The main reason computational systems use thematic roles, and semantic roles in general, is to act as a shallow semantic language that can let us make simple inferences that aren't possible from the pure surface string of words, or even the parse tree. For example, if a document says that *Company A acquired Company B*, the desire to know that this answers the query *Was Company B acquired?* despite the fact that the two sentences have very different surface syntax. Similarly, this shallow semantics might act as a useful intermediate language in machine translation.

Thus thematic roles are used in helping us generalize over different surface realizations of predicate arguments. For example while the AGENT is often realized as the subject of the sentence, in other cases the THEME can be the subject. Consider these possible realizations of the thematic arguments of the verb *break*:

*John broke the window.*

AGENT      THEME

*John broke the window with a rock.*

AGENT      THEME      INSTRUMENT

*The rock broke the door.*

INSTRUMENT      THEME

*The window broke*

THEME

<sup>4</sup> Fillmore, C. J. 1968. The case for case. In E. W. Bach and R. T. Harms, eds, *Universals in Linguistic Theory*, 1-88. Holt, Rinehart & Winston.

<sup>5</sup> Gruber, J. S. 1965. *Studies in Lexical Relations*. Ph.D. thesis, MIT.





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