METHODS OF WORD MEANING DESCRIPTION

METODE ALE DESCRIERII SENSULUI CUVINTELOR

(Rezumat)

Lucrarea de faţă urmăreşte să ilustreze metodele folosite de lingvişti pentru a oferi o descriere cât mai completă a sensului cuvintelor. După cum vom vedea, au fost întrebuinţate diferite metode, însă numai una a reuşit să sintetizeze informaţiile tuturor celorlalte şi să ofere cea mai bună descriere a cuvintelor. Este vorba de lexiconul generativ.

Key-words: structural semantics, transformational semantics, theta roles, generative lexicon.

Cuvinte-cheie: semantică structurală, semantică transformaţională, roluri semantice, lexicon generativ.

Different methods have been used in the semantic investigation of words: the method of semantic markers, the method of aspectual structure, the method of semantic roles and the method of the generative lexicon. The first method was used in transformational semantics[1], the second one was used in the theory of lexical aspect[2], the third one was used in the extended version of the extended generative theory of Chomsky[3] and the last one was put forward by James Pustejovsky[4].

1. Transformational semantics

Transformational semantics describe the lexical meaning as a complex conceptual structure made up of three components: semantic markers, distinctive markers (distinguishers) and selective restrictions.

[1] Katz and Fodor (1963).
[2] Vendler,(1967).
[3] mainly Fillmore (1968).
[4] Pustejovsky (1995).

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1.1. Semantic markers

Semantic markers represent the basic (primitive) items that are used to describe the meaning of words. They describe the meanings of several words and they are equivalent to semes of structural semantics. For example, for the words *sheep* and *goat*, the corresponding semantic markers are shown in (1):

(1) *sheep: animate, mammal, domestic, ruminant, adult, female.*
goat: animate, mammal, domestic, ruminant, adult, female.

1.2. Distinctive markers (distinguishers)

Distinctive markers are used to describe the meaning of a single word and to highlight its semantic uniqueness. For example, the words *sheep* and *goat* have in common the semantic markers presented above (1). The difference between these two words is given by the distinctive marker *with wool* which appears in the description of *sheep* and by the distinctive marker *long-haired* which appears in the description of *goat*:

(2) *sheep: animate, mammal, domestic, ruminant, adult, female, with wool*
goat: animate, mammal, domestic, ruminant, adult, female, long-haired

1.3. Selective restrictions

Selective restrictions offer information on the possibilities of semantic combination between two words. Therefore, selective restrictions specify semantic subclasses selected by the lexical item. For example, a verb such as *to bleat* requires a subject noun phrase [+ animate] and a verb such as *to paint* requires a subject noun phrase [+ human] and an object noun phrase that belongs to the category [+ picture]: landscape, portrait, etc.:

(3) *a. Sheep bleat.*
** Doors bleat.*
b. John is painting a house/a sheep.
** The pencil/*the fish is painting a house.*

Selective restrictions present both semantic and syntactic markers in angle brackets. The selective restrictions of the verbs *to bleat* and *to paint* are shown in (4):

(4) *to bleat* $<N_{[+\ animate]}, ->$
to paint $<N_{[+\ human]}, N_{[+\ image]}>$

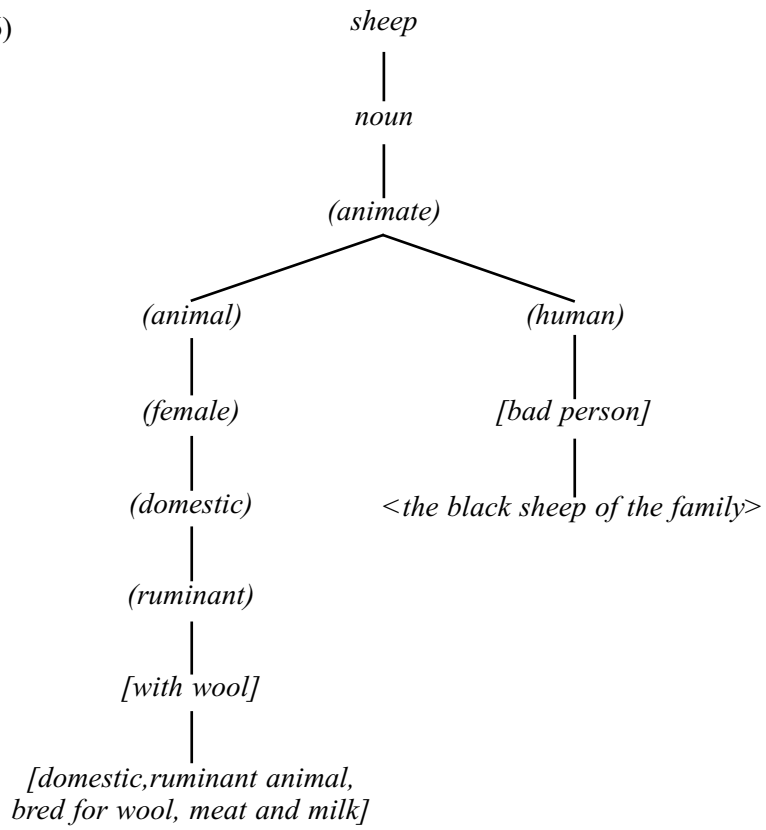
By taking into account these three components, the lexical item will appear as a complex symbol with many features. For example, the complex symbol for *sheep* has the following features:

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(5) *sheep [+N, +countable, +animate, +animal, +domestic, + ruminant, + female, + wool]*

All these aspects of semantic description are included in the representation (in a tree) of the lexical meaning *sheep* (6):

(6)



It should be noted that for the semantic representation, semantic markers and selective restrictions are mandatory, while distinctive markers may lack. In the case of words that have several meanings, such as the one in (6), the representation will have a number of branches in direct proportion to the number of meanings.

In the case of transformational semantics, for the description of a lexical meaning, the meaning components (especially semantic markers) represent varied aspects of the denotation of a word. They present issues related to the:

- structure of the denotatum
- how it was formed
- its use
- its belonging to a similar class of entities

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Thus, for the words *sheep* and *house*, the information related to the structure of the denotatum are: *head, feet, hooves, wool*, respectively *doors, walls, rooms, roof*. The information regarding the way in which the two entities have emerged is given by the semantic markers *it is born*, respectively *it is built*. In terms of their use, the specific semantic markers are *raised for meat, milk and wool*, respectively *built to be inhabited*. As for the final part of denotatum, the specific semantic markers are *animate (domestic animal*) or *non-animate (artifact).*

2. The theory of semantic (thematic) roles

Another method used to characterize the meaning of words refers to semantic roles. Semantic roles describe the relation between the participants in an event and identify the arguments in terms of the semantic relation they have with the verb. A verb such as *to open* involves two participants who receive certain roles (Agent and Theme). Hence the verb *to open* requires two arguments (7):

(7) *John opened the window.*
(Agent) (Theme)
NP_1 NP_2

Fillmore (1968) offered a simple lexical-semantic representation of a predicate conceived as a set of cases or semantic roles. According to him, cases represent "a set of universal, presumably innate concepts, which identify certain types of judgments that human beings are capable of making about the events that are going on around them, judgments about such matters as who did it, who it happened to, and who got changed" (1968:48). The agent plays the most important semantic role (7) and it is the initiator or the one who performs the action. It is characterized by the features /+animate/, /+intention/, /+responsibility/. The theme (8) is associated with verbs of motion or location. In the case of verbs of motion, the theme represents what moves (8a1), and in the case of verbs of location, the theme is the entity whose location is described (8a2). The patient (8b) is the entity that undergoes a change. The experiencer (8c) is the entity that experiences a psychological state or event. The beneficiary (8d) is the entity that benefits from an action. The instrument (8e) is the object that initiated the action. The location (8f) presents the place of action. The purpose (8g) is the entity to which something leaves, the source (8h) is the entity from which something leaves and the path (8i) is the trajectory of an object.

(8) *a.1. The book fell.*
2. The book is on the desk.
b. John broke the window.
c. John is happy.
d. I cooked for you.
e. John cut the tree with an axe.

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f. John put the book on the desk.
g. John went to school.
h. John comes from England.
i. John ran through the tunnel.

It follows that this selection is relevant for the classification of verbs. Thus, for a verb like *break*, we will have the following lexical description:

(9) *to break <(Agent), Patient, (Instrument)>*
Ion broke the balloon with a pin. <Agent, Patient, Instrument>
The pin broke the balloon. <Instrument, Patient>
The balloon broke. <Patient>

Semantic roles are closely related to the subcategorization rules:

(10) *John broke the balloon with a pin. <Agent, Patient, Instrument>*
[NP PP]

3. The theory of lexical aspect

While Fillmore focuses on the description of participants involved in an event, Vendler (1967) and Dowty (1979) focus on the description of events. They present events in terms of aspect, i.e. the way in which the speaker perceives the event: as complete or incomplete, as started or finished, as repetitive or unique. Given the aspectual value of events, the following classes of verbs result: states (11a), activities (11b), achievements (11c) and accomplishments (11d).

(11) *a. to know, to believe, to love*
b. to run, to walk , to swim
c. to find, to recognize, to lose
d. to paint a picture, to make a chair, to draw a circle
(Dowty, 1979: 54)

As we can see from (12), each class presents unique features: *+/- dynamic*, *+/- durative*, *+/- telic*.

(12)

States	***Activities***	***Achievements***	***Accomplishments***
[-dynamic]	*[+dynamic]*	*[+dynamic]*	*[+dynamic]*
[+durative]	*[+durative]*	*[-durative]*	*[+durative]*
[-telic]	*[-telic]*	*[+telic]*	*[+telic]*

In addition to these features, the four classes of verbs also present some differences. According to Dowty, states cannot occur in the imperative form, they cannot be used with the adverbs *deliberately* and *carefully* and they cannot be complements of the verbs *to force* and *to persuade*:

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(13) **Know the answer!*
**John deliberately knew the answer.*
** John forced Harry to know the answer.* (Dowty, 1979: 55)

Moreover, activities cannot appear with time adverbials that start with "in":

(14) **John walked in an hour. vs. John walked (for) an hour.*
Dowty, 1979: 56)

He also states that achievements cannot combine with durative time adverbials or with adverbs such as *deliberately, carefully, alert, obedient* and cannot be the complements of *to finish*:

(15) **John found the mistake an hour.*
**Ion deliberately found the mistake.*
**Ion finished finding the mistake.*

As for accomplishments, they become ambiguous when they appear next to the adverb *almost*. In (16) we have two interpretations: 1) John had the intention to paint a picture but he changed his mind and did something else and 2) John began to paint and he almost finished.

(16) *John almost painted a picture.* (Dowty, 1979: 58)

The category of aspect plays an important role in the description of verbs and of the nouns that derive from them. The importance of aspect consists of highlighting the link between verbs and deverbal nouns. For example, state verbs such as *to love* have their corresponding state noun *love*, activity verbs such as *to dance* have their corresponding activity noun *dance*, achievement verbs *to lose* have their corresponding noun *loss* and accomplishment verbs such as *to build* have their corresponding noun *building*.

The picture sketched above is not accidental: each of the three theories is valued in the project of generative lexicon, but in different forms and with different weights.

4. The Generative Lexicon

Pustejovsky brings a new model of lexical description: the generative lexicon. It offers a a more detailed representation of the meaning of a word than any other representation. The generative lexicon presents three levels of representation: argument structure (ARGSTR), event structure (EVENSTR) and qualia structure (QUALIA).

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The argument structure is anticipated by Fillmore's thematic roles. However, Pustejovsky is not interested in the types of thematic roles that a lexical item selects, but in the number and types of arguments it selects. There are four types of arguments for a lexical item: true arguments (17a), default arguments (17b), shadow arguments (17c) and true adjuncts (17d). The arguments for the lexical item *build* are presented in (18).

(17) *a. John ran.*
b. John built the house out of bricks.
c. John danced a waltz.
d. John went to the zoo on Sunday.

(18) *build*

$$ARGSTR = \begin{bmatrix} T-ARG_1 = x : human \\ T-ARG_2 = y : artifact \\ D-ARG_1 = z : material \end{bmatrix}$$

The event structure characterizes both the basic event type of the lexical item and its subeventual structure. According to Vendler, events are divided into four categories: *states*, *activities*, *achievements* and *accomplishments*. Pustejovsky mentions only three categories: *states, processes* and *transitions.* He describes the four categories presented by Vendler in relation to states and processes. Therefore, *activities* are defined as *processes* and *achievements* şi *accomplishments* are called *transitions* and they are defined by the combination of the two concepts: a process and a state that results. The prominence for an event is given by the HEAD marker.

(19) *build*

$$EVENTSTR = \begin{bmatrix} E_1 & = & process \\ E_2 & = & state \\ RESTR & = & <_a \\ HEAD & = & process \end{bmatrix}$$

Qualia structure represents the novelty of the theory presented by Pustejovsky. It describes four essential characteristics of the meaning of a word: the *constitutive role* (the relation between an aobject and its constituent parts: material, components), the *formal role* (that which distinguishes the object within a larger domain, its physical characteristics: orientation, form, dimension), the *telic role* (the purpose and the function of the object) and the *agentiv role* (factors involved in the origin of the object: artefact, creator). As

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we can see in (20), qualia helps in distinguishing between semantically related words:

(20)

novel

$$Qualia = \begin{bmatrix} CONSTIT & = & \text{narrative} \\ FORMAL & = & \text{book} \\ TELIC & = & \text{to read} \\ AGENT & = & \text{written} \end{bmatrix}$$

dictionary

$$Qualia = \begin{bmatrix} CONSTIT & = & \text{list of words} \\ FORMAL & = & \text{book} \\ TELIC & = & \text{to consult} \\ AGENT & = & \text{compiled} \end{bmatrix}$$

It also enables us to understand why certain phrases such as a *bottle of wine* are correctly formed while others such as a *bottle of shoes* are not. Qualia plays a very important role because it helps to predict the phrase that is to be attached to the head. That is, we cannot attach randomly any phrase to a given head because in the meaning of the head there are some items that disallow the combination with other words. As we can see from the example in (21), the head *bottle* presents some characteristics that match with the adjunct *wine*: *the bottle* contains a *liquid* (thus we obtain the constitutive role of the head) and the fact that wine is a liquid makes it possible to attach to the head. Other adjuncts compatible with the head *bottle* could be: *of whisky, of champagne*, etc. Moreover, the telic role of *wine* becomes the telic role (purpose) of the whole noun phrase *bottle of wine* and that is *to be drunk*. An adjunct such as *shoe* cannot attach to the head bottle since its telic role is to be worn. So, the telic role of the adjunct is not compatible with the telic role of the head.

(21) *a.*

bottle

$$\begin{array}{lcl} ARGSTR & = & [ARG1 = x : glass] \\ EVENSTR & = & [D-E1 = state] \\ QUALIA & = & \begin{bmatrix} FORMAL & = & x \\ CONSTIT & = & of \quad wine(e1, x, y) \end{bmatrix} \end{array}$$

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b.

$$\begin{array}{lll} & wine & \\ ARGSTR & = & \begin{bmatrix} ARG1 & = & y:liquid \\ D-ARG1 & = & z:human \end{bmatrix} \\ EVENSTR & = & \begin{bmatrix} D-E1 & = & process \end{bmatrix} \\ QUALIA & = & \begin{bmatrix} FORMAL & = & y \\ TELIC & = & to\ \ drink(e1,z,y) \end{bmatrix} \end{array}$$

c.

$$\begin{array}{lll} & bottle\ \ of\ \ wine & \\ ARGSTR & = & \begin{bmatrix} ARG1 & = & x \\ D-ARG1 & = & z:human \end{bmatrix} \\ EVENSTR & = & \begin{bmatrix} D-E1 & = & process \\ E2 & = & state \\ HEAD & = & state \end{bmatrix} \\ QUALIA & = & \begin{bmatrix} FORMAL & = & x \\ CONSTIT & = & y \\ TELIC & = & to\ \ drink(e1,z,x) \end{bmatrix} \end{array}$$

d.

$$\begin{array}{lll} & shoes & \\ ARGSTR & = & \begin{bmatrix} ARG1 & = & y \\ D-ARG1 & = & z:human \end{bmatrix} \\ EVENSTR & = & \begin{bmatrix} D-E1 & = & state \end{bmatrix} \\ QUALIA & = & \begin{bmatrix} FORMAL & = & y \\ TELIC & = & to\ \ wear(e1,z,y) \end{bmatrix} \end{array}$$

Conclusions

In this paper it has been shown that the generative lexicon is the best method to describe the meaning of words. It is important not only for the synthesis that it makes, but also for the fact that it solves issues that the above mentioned theories could not have solved because there was not even the thought that such issues exist.

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