KAREL PALA – BOHUMILA PODLEZLOVÁ

ON SEMANTICS OF LATIN INTRANSITIVE VERBS

1. Introduction

In our paper we make an attempt to describe the meanings of a group of Latin intransitive verbs by means of Fillmore's case theory (Fillmore 1968). We make use of a set of deep cases as they have originally been defined by Fillmore.

The case frames for the groups of the Latin intransitive verbs are suggested and linked up with their surface cases. Table 1 displays these relations and shows, at the same time, that we do not work with the deep and surface structures of sentence as it is usual in standard transformational grammar. Rather, on the base of Table 1 the simple context-free grammar has been written and then tested on the computer SAAB D 21. What we wanted to show was that semantically oriented context-free rules we had suggested could give good results as well and that we did not need to bother about such complex structures as the deep and surface ones. The results we have obtained on the computer give evidence that our "simple" description was succesful — no meaningless Latin sentences have been generated by the computer. From this fact we conclude that a precise and explicit description of verbal meanings is a necessary prerequisite for any kind of formal description of a language — either generative or any other.

2. Methodological Remarks

The recent developments in modern linguistics show clearly the shortcomings of Chomsky's Standard Theory (1965) — the most important of them lies in the fact that the issues of the semantic description have not been solved in a satisfactory way. The semantic component in the Standard Theory was defined as interpretive and that is why this way of treating semantics brings about a number of difficulties and does not make it possible to describe the semantics of language in a natural and simple way. Chomsky in his paper (Chomsky 1969) tries to find new arguments to support his standpoint — even if we decide to accept some of them, our most important doubts will not be dissipated.

On the contrary, the development of generative semantics with its orientation to formal logic and its attempts to formulate more precisely the notion of "semantic representation of sentence" seems to be more promising and the approaches of the generative semantics should so far be regarded as more successful. Very convincing arguments have been given in this respect at the 1973 Cambridge Conference on formal semantics of natural languages (Cambridge 1973).

In the context of generative semantics we regard as the most interesting attempt

the description of some semantic properties of sentence made by Fillmore in his case theory (1968). Its stimulating feature lies in the way in which deep structures are treated — they are essentialy oriented semantically and understood formally as logical predicates the arguments of which are already semantically oriented. This follows from the fact that each argument of a predicate represents one possible semantic type, i.e. it is one of the possible deep cases. It is not without interest that Fillmore considers his cases as having an ontological status: "The case notions comprise a set of universal presumably innate concepts which identify certain type of judgments 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, what got changed." (p. 24.)

On the other hand, notice that Fillmore's suggestion is new in the field of transformational grammars but it is not, however, new in principle. The attempts to give semantic characteristics of the cases had been made earlier also by some Czechoslovak grammarians, though based on a different terminology (Trávníček 1951, Oravec 1966). It is even possible to say that the deep cases suggested by Fillmore match surprisingly well with the semantic classification of the cases offered by Trávníček (1951).

The shortcoming found in all these approaches, including Fillmore's is that the set of the deep cases or, in other words, the semantic classification of the cases comes out too rough. When we describe a larger number of verbs differing in their semantic types we are immediately in need of a more extensive and better differentiated inventory of the deep cases. This follows clearly from the attempts made by M. Kubišová (1974) and B. Podlezlová (1974) in their diploma theses concerning Czech transitive and intransitive verbs.

We regard it as an advantage of Fillmore's approach that he adopts the methods of symbolic logic and in such a way tries to work out a formalized description of the meanings of verbs, based on the predicate calculus of the first order. Of course, we do not want to state that the first order predicate calculus is sufficient enough for a description of the semantics of natural languages but, this sort of methodological orientation should be regarded as stimulating.

3. The Semantic Classification of the Latin Intransitive Verbs

The formal means of the description of simple sentences is the CASE FRAME consisting of a given predicate (i.e. verb) and its corresponding arguments (i.e. deep cases) which can accompany it.

For instance, the Latin verb misereor can have the following case frame (1):

(1) [misereor + A + D]

(1a) Mater pulchra miseretur puerorum

In our paper we work with the six deep cases:

(i) Agentive (A), the case of the typically animate perceived instigator of the action identified by the verb.

(ii) Instrumental (I), the case of the inanimate force or object causally involved in the action or state identified by the verb.

(iii) Dative (D), the case of the animate being affected by the state or action identified by the verb.

(iv) Factitive (F), the case of the object or being resulting from the action or state identified by the verb, or understood as a part of the meaning of the verb.

(v) Locative (L), the case which identifies the location or spatial orientation of the state or action identified by the verb.

(vi) Objective (O), the semantically most neutral case, the case of anything representable by a noun whose role in the action or state identified by the verb is identified by the semantic interpretation of the verb itself. (Fillmore 1968, 24—25).

3.1. The Relation between the Deep and Surface Cases

For the groups of the Latin intransitive verbs we work with it is necessary to set up the relationship between the deep cases described above and the surface cases as they are known from the traditional grammars of Latin (e.g. Novotný 1957).

The following are the surface cases we work with (they are denoted by figures):
(1) nominative
(2) genitive
(3) dative
(4) accusative
(6) ablative
(p6) prepositional ablative

The next step then is to show the correspondence of the deep and surface cases. It is displayed in Table 1:

Table 1

Deep case	Surface case
AGENTIVE (A)	nominative (1) dative (3) accusative (4)
OBJECTIVE (O)	nominative (1) genitive (2) dative (3) accusative (4) ablative (6)
DATIVE (D)	nominative (1) genitive (2) dative (3)
LOCATIVE (L)	ablative (6)
INSTRUMENTAL (I)	ablative (6)
FACTITIVE (F)	genitive (2)

3.2. The Groups of the Latin Verbs

The investigation takes into consideration only those Latin verbs that cannot occur with the surface accusative, i.e. the verbs occurring with the surface dative, genitive and ablative.

Firstly, the investigated Latin verbs are divided into larger groups according to the surface case they can have and after that their semantic properties are taken into account. This second criterion gives the smaller groups within the larger ones.

Our material contains 120 Latin intransitive verbs excerpted from the Latin-Czech Dictionary (Pražák, Novotný, Sedláček, 1939), which includes approximately 18 000 entries — 1000 out of them are verbs. Neither do we describe the verbs that behave as intransitive but can frequently occur with the accusative and the derived verbs not differing in meaning from the respective basic verbs.

Now let us explain the notation we use. Symbol V together with two figures always denotes a verb group and its surface case and its number respectively. Symbol V21 thus means a verb group with the surface genitive and that it is group number 1. Analogically, for instance, V32 denotes verb group number 2 having the surface dative. Symbols of NP type denote the deep cases and their respective surface realizations. For example, NP1A consists of the first part — NP1 expressing that it is a noun phrase realized on the surface as a nominative, and of the second part — A expressing that the semantic value of that noun phrase (NP1) is AGENTIVE. Similarly, symbol NP2D means that a surface genitive noun phrase is attached to the semantic value DATIVE, and symbol NP2O denotes a surface genitive noun phrase with the respective semantic value OBJECTIVE, etc.

A verb belonging to some of the possible groups can be associated with its CASE FRAME, e.g. a verb from group V31 can occur in the case frame: [NP1A... NP3D]. In this way it is possible to express the fact that verb group number 1 has AGENTIVE as its first argument superficially realized as the surface nominative (NP1A) and deep DATIVE as its second argument on the surface realized as the dative (NP3D).

Further, we bring here the verb groups and the verbs belonging to them together with their respective case frames. The meaning of each verb group is characterized by the heading in inverted commas " " .

V21   [NP1A VP21 NP2D], "remembering and forgetting"
           reminiscor, reminisci
           memini, -isse
           obliviscor, oblivisci

V22   [NP1A VP22 NP2D], "to take mercy"
           misereor, -eri

V23   [NP1A VP23 NP2O], "to lack"
           egeo, -ere
           indigeo, -ere

V24   [NP4A VP24 NP2D], impersonal, "negative feelings"
           miseret
           paenitet
           piget
           pudet
           taedet

V25   [NP2A VP25 PRNN], impersonal, "to take interest in"
           interest

VAK21 [NP1A VPAK21 NPO1], "verba iudicalia" semantically
consistent group of verbs with two objects — one of them
is the surface genitive
damno, -are
arguo, -ere
convinco, -ere
arcesso, -ere
accuso, -are
iudico, -are

V31 [NP1A VP31 NP3D], "to obey, to be subordinated"
oboedio, -ire
obtempero, -are
obsequor, -sequi
pareo, -ere
servio, -ire

V32 [NP1A VP32 NP3D], "positive attitude to an object and
its manifestation"
blandior, -iri
lenocinor, -ari
palpor, -ari
assentor, -ari
assentior, -iri
indulgeo, -ere
concedo, -ere
commodo, -ere
concordo, -are

V33 [NP1A VP33 NP3D], "negative attitude to an object and
its manifestation"
invideo, -ere
obsto, -are
succenseo, -ere
malefacio, -facere
irascor, -asci
convincior, -ari
minor, -ari
obsisto, -ere

V34 [NP1A VP34 NP3D], "to trust and distrust"
credo, -ere
fido, -ere
diffido, -ere

V35 [NP1A VP35 NP3O], "to benefit and the opposite"
consulo, -ere
adsum, -esse
adsideo, -ere
prosum, prodesse
obsecundo, -are
suffragor, -ari

prospicio, -ere
opitulor, -ari
absum, -esse

medeor, -eri

faveo, -ere
patrocinor, -ari
succurro, -ere

V36   [NP1A VP36 NP3O], "to be anxious about somebody"
timeo, -ere
caveo, -ere
metuo, -ere
paleo, -ere

V37   [NP1A VP37 NP3D], "to point at something"
accedo, -ere
accurro, -ere
succedo, -ere

V38   [NP1A VP38 NP3D], "to show consent to an activity of an
animal object"
gratulor, -ari
annuo, -ere
ignosco, -ere

V39   [NP1A VP39 NP3O), "to make use of an object"
operor, -ari
colludo, -ere
illudo, -ere

V310   [NP1A VP310 NP3D], "superior position of a subject with respect to an
object"
praesum, -esse
moderor, -ari
antecello, -ere

V311   [NP1O VP311 NP3D], "coherence, connection of a subject with an
object"
cohaereo, -ere
subsum, -esse

V312   [NP1O VP312 NP3D], "a subject is subordinated to an object"
obtingo, -ere
desum, -esse
succumbo, -ere

V313   [NP1O VP313 NP3A], "to like and to dislike"
placeo, -ere
displiceo, -ere

V314   [NP1A VP314 NP3D], "influencing an object by a subject"
occurro, -ere
persuadeo, -ere
adsto, -are

V315   [NP1A VP315 NP3O], "to spare something"
parco, -ere

V61   [NP1D VP61 NP60], "to have an abundance of something and the opposite"
abundo, -are
affluo, -ere
emineo, -ere
valeo, -ere
exubero, -are
helluor, -ari
egeo, -ere
indigeo, -ere
careo, -ere
vaco, -are

V62   [NP1D VP62 NP260], "to live on something"
vivo, -ere
pascor, pasci

V63   [NP1A VP63 NP6L], "to go away from something"
abscedo, -ere
absisto, -ere
absum, -esse
emergo, -ere

V64   [NP1A VP64 NP60], "to have or obtain a thing or the opposite"
potior, -iri
utor, uti
abstineo, -ere

V65   [NP1D VP65 NP60], "to show a negative attitude to something"
pallesco, -ere
paveo, -ere
disconvenio, -ire

V66   [NP10 VP66 NP6L], "particular connection of a subject with an object"
haereo, -ere
consto, -are

V67   [NP1A VP67 NP6I], "to hold an office and the opposite"
fungor, -i defungor, -i

V68   [NP1A VP68 NP6I], "to lean against something"
nitor, niti

Vp61   [NP1A VP61 NPp6p0], "going away of a subject"
degenero, -are
abhorreo, -ere
dissentio, -ire
dissideo, -ere
discedo, -ere

(Group Vp61 includes the verbs occurring with the surface prepositional ablative and we put it here just as an example.)

4. The Context-free Grammar G_L

The semantic classification of the Latin intransitive verbs as presented above was built up into a formal model, i.e. in context-free grammar G_L which serves as a formal means for testing the elaborated semantic classification.

Then it is possible to test grammar G_L on a computer and require it to reach a certain degree of descriptive adequacy. If testing G_L on the computer gives good results in this respect, then it is possible to take for granted that the built-in semantic clasification of Latin verbs can also be considered reliable and successful. This holds good for any other kind of classification one would like to test depending on the purposes of the investigation.

To test a grammar, for example a grammar like G_L, means to test it for a degree of descriptive adequacy, i.e. the aim is to find out what sentences the grammar (e.g. G_L) can generate and how close they are to the actual grammatical and meaningful sentences of the language — in our case Latin.

Grammar G_L is defined in the following way:

$$G_L = (V_T, V_N, R_L, S)$$

where V_T is interpreted as a finite set of Latin words, i.e. as a Latin terminal vocabulary. Thus set V_T contains the particular surface (inflected) forms of the Latin verbs in 3rd person, singular, pres. ind. act., of nouns, adjectives and pronouns in the respective surface cases.

V_N is interpreted here as a set of grammatical categories (metavariables) by means of which the description of the syntactic and semantic properties of the selected fragment of Latin is made (including, of course, the syntactic and semantic properties of the selected Latin intransitive verbs). We notice that the grammatical categories belonging to V_N partly correspond to the usual grammatical categories as they have been used in the traditional grammars and partly differ from them.

Set R is interpreted as a finite set of the context-free rules of the form $A \rightarrow \omega$, $A \in V_N$ and ω is a non-empty string of symbols belonging to $V_N \cup V_T$.

Symbol $S \in V_N$ is a designated initial symbol by which any derivation in G_L has to begin. The other details concerning both the formal properties of G_L type grammars and the computer implementation together with the conditions on computer testing can be found in our earlier paper (Pala 1968).

An abbreviated entry will be given as an example for the first rule and for some other rules as well. Their successive application leads to the deriving of the particular Latin sentence. It can easily be seen that the lines in the first rule correspond (except for minor notational differences) to the case frames introduced in the previous section together with the classification of the Latin verbs.

(1)
$$S \rightarrow
\begin{bmatrix}
\text{NP1A} & \text{VPG1} & \text{NP2D} \\
\text{NP1A} & \text{VPG2} & \text{NP2D} \\
\text{NP1A} & \text{VPG3} & \text{NP20} \\
\text{VPG4} & \text{NP4A} & \text{NP2D} \\
& \cdot & \\
& \cdot & \\
& \cdot & \\
\text{NP1A} & \text{VPA8} & \text{NP6I} \\
\text{NP1A} & \text{VPAP1} & \text{NP6PO}
\end{bmatrix}$$

(2)   VPG1 → VG1

Rule (2) expresses, to put it roughly, the fact that the verb phrases of a Latin sentence can be represented by a verb belonging to group VG1 (= V21), i.e. by a verb having the surface genitive and belonging to the group of verbs denoting "remembering and forgetting".

(31)   NP1A → N1AM A1M

Rule (31) can be interpreted as meaning that the subject of a Latin sentence can be represented by a noun phrase realized on the surface as a noun in the nominative expanded by an adjective and having the semantic value of the AGENTIVE.

(32)   NP2D → N2D

Rule (32) says that the object of a Latin sentence can be expressed by a noun phrase realized superficially as the genitive and having the semantic value of the DATIVE.

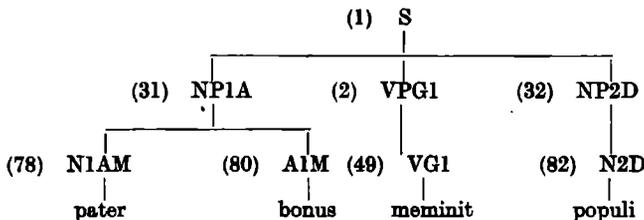(49)   VG1 → {reminiscitur, meminit, obliviscitur}

Rule (49) prescribes which specific verbs can be substituted for symbol VG1 obtained when rule (2) was applied.

(78)   N1AM → {pater, frater, servus, miles}

Rule (78) is similar to the previous one and shows which particular Latin nouns can be substituted for by symbol N1AM. Analogically, if we make use of rule (32) and get symbol N2D, we can expand it by rule (82).

(82)   N2D → {quaestoris, populi, fratrum}

The way in which the rules mentioned above are successively applied can be displayed in the following tree graph:

```
                        (1)   S
                              |
          ┌───────────────────┼───────────────────┐
      (31) NP1A         (2)  VPG1         (32)  NP2D
        ┌───┴───┐             |                   |
(78) N1AM   (80) A1M   (49)  VG1         (82)  N2D
      |         |             |                   |
    pater     bonus        meminit             populi
```

The tree structure we have obtained in such a way represents a structural description of the generated Latin sentence. Our example is taken from a set of Latin sentences generated on the computer SAAB D 21 during the experimental testing.

5. The Results

Grammar G_L and the semantic classification of the Latin intransitive verbs built in it was tested experimentally on the computer SAAB D 21 in April 1973 and 305 simple Latin sentences were generated. All the generated sentences can be regarded as well-formed both syntactically and semantically. This is a very good result which proves that the suggested description of Latin verbs meanings is to be considered successful.

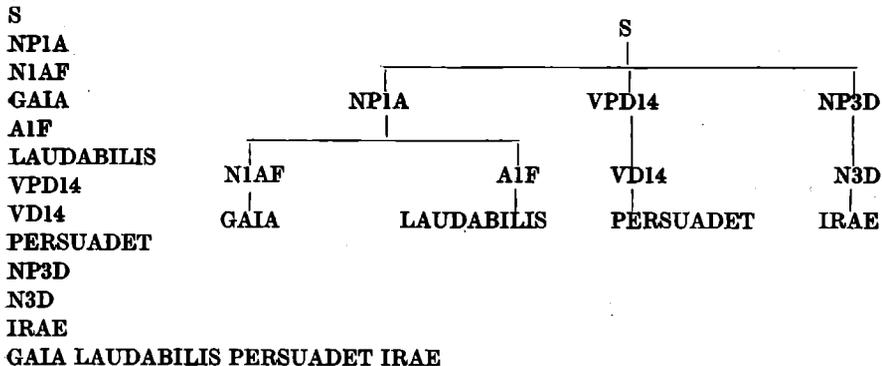The following examples come from the set of the sentences generated on the computer. The column of the symbols on the left is a parenthesis-free representation of the phrase marker of the generated sentence. There is unique one-to-one relation between the parenthesis-free representation of the phrase marker and the corresponding tree graph, so that it is quite easy to obtain a graph-tree of the particular generated sentence.
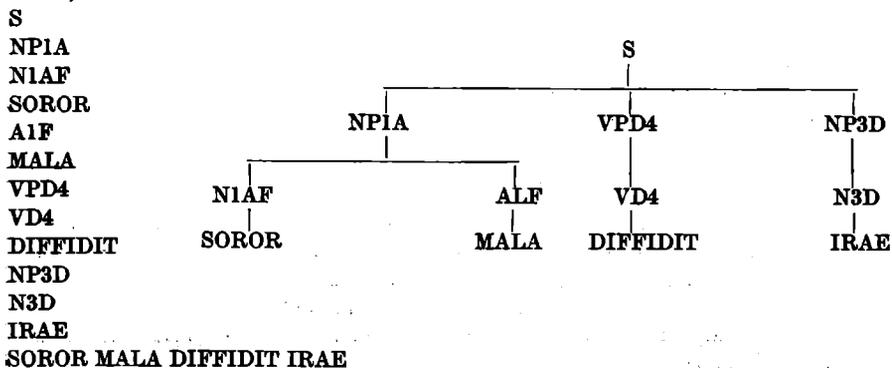
(PM 1)
S
NP1A
N1AM
MILES
A1M
MALUS
VPG2
VG2
MISERETUR
NP2D
N2D
QUAESTORIS
MILES MALUS MISERETUR QUAESTORIS

```
                              S
                              |
         +--------------------+--------------------+
       NP1A               VPG2                  NP2D
         |                  |                     |
   +-----+-----+            |                     |
 N1AM        A1M          VG2                   N2D
   |          |            |                     |
 MILES      MALUS      MISERETUR            QUAESTORIS
```

(PM 2)
S
NP1A
N1AF
GAIA
A1F
LAUDABILIS
VPD14
VD14
PERSUADET
NP3D
N3D
IRAE
GAIA LAUDABILIS PERSUADET IRAE

```
                              S
                              |
         +--------------------+--------------------+
       NP1A               VPD14                 NP3D
         |                  |                     |
   +-----+-----+            |                     |
 N1AF        A1F          VD14                  N3D
   |          |            |                     |
 GAIA     LAUDABILIS    PERSUADET              IRAE
```

(PM 3)
S
NP1A
N1AF
SOROR
A1F
MALA
VPD4
VD4
DIFFIDIT
NP3D
N3D
IRAE
SOROR MALA DIFFIDIT IRAE

```
                              S
                              |
         +--------------------+--------------------+
       NP1A               VPD4                  NP3D
         |                  |                     |
   +-----+-----+            |                     |
 N1AF        ALF          VD4                   N3D
   |          |            |                     |
 SOROR      MALA       DIFFIDIT               IRAE
```

(PM 4)
S
NP1A
N1AF
MERETRIX
A1F
MAXIMA
VPD15
VD15
PARCIT
NP30
N30
VITAE

```
                                           S
                                           |
                   NP1A              VPD15           NP30
                    |                  |               |
          N1AF              A1F       VD15            N30
           |                 |         |               |
        MERETRIX          MAXIMA     PARCIT          VITAE
```
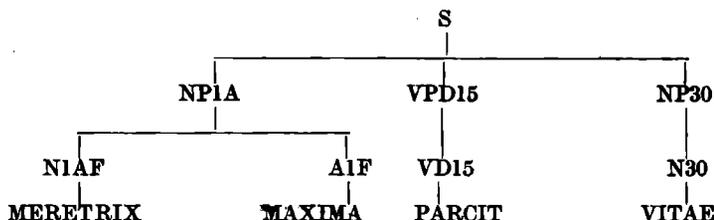
MERETRIX MAXIMA PARCIT VITAE

We can conclude by saying that the results obtained on the computer confirm the starting assumptions on which the mentioned semantic classification of the examined Latin intransitive verbs has been constructed. The formal apparatus we made use of is not complicated at all, nevertheless it gives much better results than a similar grammar not semantically oriented. Also with this kind of semantically oriented grammar we do not need to think of the use of the transformational rules and of quite a complex semantic component. Of course, on the other hand, we do not require such a grammar to be a full description of the language under investigation.

The described way of testing also makes it possible to reduce the arbitrary features of the description worked up intuitively to a reasonable degree and to compare the alternative descriptions in an objective way.

BIBLIOGRAPHY

Fillmore, Ch. J., 1968. *The Case for Case*, in: Universals in Linguistic Theory, ed. by E. Bach and R. T. Harms, New York
Fillmore, Ch. J., 1969. *Types of Lexical Information*, in: Studies in Syntax and Semantics, ed. by F. Kiefer, Dordrecht
Fürst, K., 9132, *Latinská mluvnice pro gamnasia a reálná gymnasia* (A Latin Grammar for Secondary Schools), Praha
Chomsky, N., 1965. *Aspects of the Theory of Syntax*, MIT Press
Chomsky, N., 1969. *Deep Structures, Surface Structures and Semantic Interpretation*, mimeographed
Kubišová, M., 1974 *Popis sémantiky českých přechodných sloves* (The Description of the Semantics of Czech Transitive verbs), Diploma thesis, FF UJEP, Brno
Novotný, F., 1957. *Základní latinská mluvnice* (The Essentials of Latin Grammar), Praha
Oravec, J., 1966. *Väzba slovies v slovenčine* (Verbal Constructions in Slovak), Bratislava
Pala, K., 1968. *Náhodné generování českých vět* (Random Generation of Czech Sentences), Slovo a slovesnost 29, 45—56.
Podlezlová, B., 1973. *Sémanticky orientovaný generativní popis latinských sloves nepřechodných* (Semantically Oriented Generative Description of the Latin Intransitive Verbs), Minor thesis, FF UJEP, Brno

Podlezlová, B., 1974. *Sémanticky orientovaný generativní popis českých sloves nepřechodných* (Semantically Oriented Generative Description of the Czech Intransitive Verbs), Diploma thesis, FF UJEP, Brno

Pražák, Novotný, Sedláček 1939. *Latinsko-český slovník* (A Latin-Czech Dictionary), Praha

Stenius, E., 1973. *Syntax of Symbolic Logic and Transformational Grammar*, Synthese 26, 57—80.

Šáchová, Z., 1974. *Sémantika českých sloves označujících psychické reakce* (On the Semantics of Czech Verbs Denoting Some Emotional Reactions), Diploma thesis, FF UJEP, Brno

Trávníček, F., 1951. *Mluvnice spisovné češtiny II* (Skladba), (A Grammar of Standard Czech II (Syntax)), Praha

POPIS SÉMANTIKY LATINSKÝCH NEPŘECHODNÝCH SLOVES

V článku se činí pokus popsat významy latinských nepřechodných sloves na základě Fillmorovy pádové teorie (Fillmore 1968) s využitím původního souboru hloubkových pádů.

Pro jednotlivé skupiny latinských nepřechodných sloves jsou v článku navrženy tzv. pádové rámce a jim přiřazeny odpovídající pády povrchové. Tyto vztahy jsou zachyceny v tabulce 1 (Table 1). Je patrné, že v této práci neužíváme hloubkových a povrchových struktur vět a transformací, jak je to obvyklé v běžných transformačních popisech jazyka. Tabulka 1 naopak posloužila jako východisko pro sestavení jednoduché nekontextové frázové gramatiky, která pak byla testována na samočinném počítači (SAAB D 21 v dubnu 1973). Snažíme se ukázat, že sémanticky orientovaná nekontextová pravidla implicitně obsahující sémantickou klasifikaci latinských nepřechodných sloves mohou dávat dobré výsledky — všechny jednoduché latinské věty generované na počítači (305 vět) byly sémanticky i syntakticky správné. Výsledky získané testováním ukazují, že není za každou cenu třeba pracovat se složitým komplexem transformačních pravidel a hloubkovými a povrchovými strukturami a že náš „jednoduchý" popis může být pokládán za úspěšný.

Jádrem článku je seznam sémantických skupin zkoumaných 120 latinských nepřechodných sloves s jejich pádovými rámci. Na základě pádových rámců a tabulky 1 byla sestavena nekontextová gramatika G_L, která pak byla testována na počítači.

Závěrem lze říci, že úspěšnost navrženého popisu fragmentu latiny je dána vypracováním formálního popisu příslušných slovesných významů. Je tedy jasné, že bez formálního popisu sémantiky sloves se neobejde žádný pokus o formální popis jazyka — ať generativní či kterýkoli jiný.