The Lexicographic Representation of Czech Diatheses: Rule Based Approach

Václava Kettnerová and Markéta Lopatková[*]

Charles University in Prague, Faculty of Mathematics and Physics
Institute of Formal and Applied Linguistics

Abstract. In this paper, we propose a method of the representation of Czech diatheses in the valency lexicon of Czech verbs, VALLEX. Under the term diatheses, specific relations between uses of the same verb lexeme are considered here. These relations are associated with changes in valency frames of verbs which stem from the changes in the linking of situational participants, valency complementations and surface syntactic positions. We distinguish three types of Czech diatheses according to which linguistic means they are based on: (i) grammatical, (ii) syntactic and (iii) semantic diatheses. We demonstrate that in case of grammatical and syntactic diatheses, the changes in valency structure of verbs are regular enough to be captured by formal syntactic rules whereas the changes associated with semantic diatheses can be represented rather by lexical rules. In conclusion, we show that on certain conditions the different types of diatheses can be combined together.

1 Introduction

Although diatheses have been widely debated in the literature in the past decades, the results of the theoretical research have not been fully applied in the available lexical resources so far. Individual theories dealing with these phenomena are summarized, e.g., in [5]. Here we propose a rule based approach to Czech diatheses for their representation in the valency lexicon of Czech verbs, VALLEX.[1]

Diatheses are defined here as specific relations between uses of the same verb lexeme: these uses exhibit semantic affinity, however, they are syntactically structured in different ways. A question arises how it is possible to describe changes in valency structure of verbs associated with diatheses in the lexicon. When describing these changes, the distinction between situational content and structural meaning plays a key role (Section 2).

In principle, we distinguish three types of Czech diatheses according to which linguistic means they are expressed by: (i) grammatical diatheses (Section 3), (ii) syntactic diathesis (Section 4) and (iii) semantic diatheses (Section 5). This

[1] http://ufal.mff.cuni.cz/vallex/2.5/

differentiation is warranted by the fact that on certain conditions, the different types of diatheses can be combined together (Section 6).

As to the representation of diatheses, we demonstrate that whereas grammatical and syntactic diatheses can be represented by formal syntactic rules, semantic diatheses require to be described on the basis of lexical rules.

This paper follows and further develops the issues addressed in [5]. In contrast to [5], the previous typology of Czech diatheses is enriched with syntactic diathesis here. Furthermore, an adequate representation of semantic diatheses (introduced in [7] and [6]) is recapitulated. Moreover, the combination of the different types of diatheses and its representation are newly discussed.

2 Situational Content and Structural Meaning

In prototypical cases, a single meaning corresponds to a single valency structure. However, in many cases a similar meaning can be syntactically structured in a different way. See the following uses of the verb *semlít* 'to grind':

(1) a. *The millers ground wheat into flour.* – b. *Wheat was ground into flour (by the millers).*
(2) a. *The millers ground flour out of wheat.* – b. *Flour was ground out of wheat (by the millers).*

We refer to the specific relations between such uses of a verb as diatheses. For the purpose of their description, we distinguish between a so called situational content of a verb and its structural meaning.

The term *situational content* refers to the lexical-semantic characteristics of a verb which is related to a situation portrayed by the verb. This situation consists of a set of *situational participants* characterized by particular semantic properties and related by certain relations. The situational content represents a syntactically unstructured part of the verbal characteristics.

A syntactically structured part, i.e., such part in which the components of the situational content are syntactically expressed, is referred here as a *structural meaning*. In the Functional Generative Description (henceforth FGD, see esp. [16]), which serves as a theoretical background for VALLEX, the structural meaning corresponds to the tectogrammatical layer, i.e., the layer of linguistically structured meaning. The structural meaning of verb is described by a set of *valency complementations* labeled by tectogrammatical roles [9].[2]

We assume that each lexical unit of a verb is characterized by both situational content and structural meaning in a unique way: a particular set of situational participant(s) which are mapped onto a set of valency complementation(s) is characteristic of each lexical unit. Any changes in the situational content or the structural meaning lead to the change of a lexical unit of the verb.

---

[2] The distinction of the situational content and the structural meaning is inspired by [10] and [8]. Whereas the situational content is taken as a part of the verbal meaning in [10] and [8], here in accordance with FGD [16], syntactically unstructured components of the verbal meaning is taken as content issues.

Diatheses represent such relations between uses of a verb which are characterized by closely related (or the same) situational contents whose situational participants are mapped onto surface syntactic positions in a different way. The changes in the correspondence between situational participants and surface syntactic positions always affect the prominent positions of subject or direct object. Then the situation denoted by a verb is perspectivized in light of the situational participant which is mapped onto the subject or direct object.

3   Grammatical Diatheses

Grammatical diatheses and their representation are extensively discussed in [5] and [7]. Let us recapitulate their brief description. We consider grammatical diathesis as a relation between uses of a verb which are characterized by changes in the mapping between valency complementations and surface syntactic positions while the correspondence between situational participants and valency complementations is preserved. These changes arise from the use of a specific grammatical meaning of a verb and are associated with the shift of 'Agent/Bearer' from the prominent surface syntactic position of subject. We illustrate the relation of grammatical diatheses by examples (3a)-(3b):

(3) a. *Mlynáři*.ACT-Agent *semleli zrno*.PAT-Material *na mouku*.EFF-Product –
     b. *(Mlynáři*.ACT-Agent) *bylo zrno*.PAT-Material *semleto na mouku*.EFF-Product
     Eng. a. The millers.ACT-Agent ground wheat.PAT-Material into flour.EFF-Product – b. Wheat.PAT-Material was ground into flour.EFF-Product (by the millers).ACT-Agent

We observe that the uses of the verb *semlít* 'to grind' in examples (3a)-(3b) share the same situational content as well as structural meaning. As a consequence, we consider the pairs of the uses of the verb *semlít* 'to grind' in (3a)-(3b) as a single lexical unit. Then what differs these uses in (3a)-(3b) is the mapping of the valency complementations onto surface syntactic positions: (i) 'ACTor' (in both cases corresponding to the situational participant 'Agent') is mapped either onto the prominent surface syntactic position of subject, (3a), or onto a less prominent adverbial position, (3b), and (ii) 'PATient' (expressing the situational participant 'Material' in both sentences) corresponds either to the position of direct object, (3a), or to the subject, (3b), see Figure 1.

The changes in the mapping of the valency complementations and the surface syntactic positions result from the use of a specific grammatical meaning (passive meaning) of the verb *semlít* 'to grind'. We consider the use of the verb characterized by this grammatical meaning as a marked one. In FGD, these grammatical meanings of verbs are represented by a set of verbal grammatemes, see esp. [13] and [14].

We distinguish the following types of Czech grammatical diatheses. The grammatical meanings of the verbs in the marked constructions of diatheses are captured by the following values of the grammateme `diatgram`: `act` (4a), (5a), (6a), (7a) and (8a), `pass` (4b), `deagent` (5b), `rez1` (6b), `rez2` (6c), `recip` (7b) and `disp` (8b):
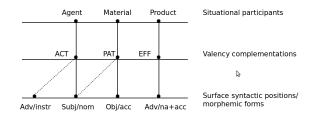
Fig. 1. The changes in the mapping of the valency complementations and the surface syntactic positions of the verb 'to grind' associated with the passive grammatical diathesis.

(4) **Passive diathesis**
   a. *Karel IV. založil$_{act}$ roku 1348 Karlovu univerzitu. –* b. *Karlova univerzita byla založena$_{pass}$ v roce 1348 (Karlem IV.).*
   Eng. a. Charles IV. founded$_{act}$ Charles University in 1348. – b. Charles University was founded$_{pass}$ (by Charles IV.) in 1348.

(5) **Deagentive diathesis**
   a. *Snídani podáváme$_{act}$ mezi sedmou a devátou hodinou. –* b. *Snídaně se podává$_{deagent}$ mezi sedmou a devátou hodinou.*
   Eng. a. We serve$_{act}$ breakfast between 7am and 9am. – b. 'Breakfast – refl – serves$_{deagent}$ – between 7am and 9am.'

(6) **Resultative diathesis**
   a. *Sekretářka mi zde objednala$_{act}$ stůl pro čtyři osoby. –* b. *Je zde objednán$_{rez1}$ stůl pro čtyři osoby. –* c. *Mám zde objednán$_{rez2}$ stůl pro čtyři osoby.*
   Eng. a. My secretary booked$_{act}$ a table for four persons here. – b. There is booked$_{rez1}$ a table for four persons. – c. 'Have – here – booked$_{rez2}$ – a table – for four persons.'

(7) **Recipient passive diathesis**
   a. *Šéf mi přidělil$_{act}$ novou pracovnu. –* b. *Dostal jsem přidělenu$_{recip}$ novou pracovnu (od šéfa).*
   Eng. a. My boss allocated$_{act}$ me a new study. – b. 'Gave – allocated$_{recip}$ – a new study – (by my boss).'

(8) **Dispositional diathesis**
   a. *Čtu$_{act}$ tento překlad. –* b. *Tento překlad se mi čte$_{disp}$ dobře.*
   Eng. a. I read$_{act}$ this traslation. – b. This translation reads$_{disp}$ well.

The representation of grammatical diatheses. We observe that in case of grammatical diatheses the changes in a valency frame of a verb are limited only to changes in morphemic forms of valency complementations. These changes are regular enough to be captured by formal syntactic rules. These syntactic rules are stored in the grammar component of the lexicon. In the data component, there is a single lexical unit representing both uses of a verb. This lexical unit is characterized by a valency frame corresponding to the unmarked use. The possibility of applying some of the rules is ascribed to each relevant lexical unit of a verb. Let us illustrate these syntactic rules by a rule for passive diathesis deriving the marked use of the verb *semlít* 'to grind' in (3b), see Table 1.

Pass.r	Unmarked	Marked
verbal grammateme `diatgram`	`act`	`pass`
valency frame	ACT_{nom}	ACT_{instr}
	PAT_{acc}	PAT_{nom}

Table 1. Pass.r rule for the passive diathesis.

The change in the grammatical meaning of a verb is represented by the change of the value of the verbal grammateme `diatgram` which is changed from `act` into `pass`. Furthermore, the rule describes the changes of morphemic forms of the valency complementations 'ACTor' and 'PATient'. These changes manifest their surface syntactic shift: (i) the shift of 'ACTor' from the subject into the adverbial position is expressed by the change of its morphemic form from nominative into instrumental and (ii) the change of surface syntactic expression of 'PATient' is captured by the change of its morphemic form from accusative into nominative (more detailed description of the rule is provided in [5]).

For the representation of the other above listed types of grammatical diatheses, other syntactic rules are formulated. On their basis, the marked members of grammatical diatheses can be derived from each lexical unit of a verb to which they are assigned.

4 Syntactic Diathesis

Syntactic diathesis is related esp. to a reciprocality in Czech. It represents another type of the relation between different uses of a verb which are characterized by the changes in the correspondence of valency complementations and surface syntactic positions while the linking of situational participants and valency complementations remains unchanged. For these reasons, similarly as in the case of grammatical diatheses, we consider the members of syntactic diathesis as two surface syntactic expressions of a single lexical unit of a verb. However, in contrast to grammatical diatheses, syntactic diathesis is not underlain by the use of any specific grammatical meaning, i.e., the grammatical meaning of a verb is preserved.

In Czech, the marked members of syntactic diathesis are represented by reciprocal constructions which result from reciprocalization, i.e., a syntactic operation on valency frames of verbs in which two (or three) valency slots – if their features allow for symmetrical usage – are used reciprocally, see esp. [11] and [12].

As to the changes in the mapping between valency complementations and surface syntactic positions, the valency complementation expressed in a less prominent surface syntactic position is shifted into the more significant syntactic position (subject or direct object) of the second valency complementation. Whereas the prominent position is 'multiplied' either by syntactic means (coordination, as in (9b)), or by morphemic means (plural, as in (10b)), the less significant position is deleted from the resulted surface syntactic structure:

(9) a. *Petr*.ACT-Speaker *svěřil Pavlovi*.ADDR-Recipient *své problémy*.PAT-Information
     – b. *Petr*.ACT,ADDR-Speaker,Recipient *a Pavel*.ACT,ADDR-Speaker,Recipient *si svěřili své problémy*.PAT-Information
     Eng. a. Peter.ACT-Speaker revealed his problems.PAT-Information to Paul.ADDR-Recipient – b. Peter.ACT,ADDR-Speaker,Recipient and Paul.ACT,ADDR-Speaker,-Recipient revealed their problems.PAT-Information (= one to another, reciprocally)

(10) a. *Přítel*.ACT-Speaker *svěřoval své problémy*.PAT-Information *příteli*.ADDR-Recipient
     – b. *Přátelé*.ACT,ADDR-Speaker,Recipient *si svěřovali své problémy*.PAT-Information
     Eng. a. The friend.ACT-Speaker revealed his problems.PAT-Information to his friend.ADDR-Recipient – b. The friends.ACT,ADDR-Speaker,Recipient revealed their problems.PAT-Information (= one to another, reciprocally)

We observe that in case of the verb *svěřit* 'to reveal' in (9a)-(9b) and (10a)-(10b), the situational content as well as the structural meaning are the same. The situational content is characterized by a set of the following participants: 'Speaker', 'Recipient' and 'Information'. These participants are mapped onto the valency complementations 'ACTor', 'ADDRessee', and 'PATient' in the same way, respectively.

What differs these uses of the verb is the surface syntactic expression of 'ADDRessee': (i) it corresponds either to the syntactic position of indirect object (9a) and (10a), or (ii) to the prominent subject position (9b) and (10b). In the later case, the change in the surface syntactic expression of 'ADDRessee' results in symmetric relation of 'Speaker' and 'Recipient', see Figure 2.
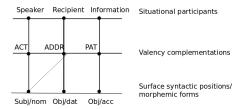

Fig. 2. The change in the mapping of the valency complementation 'Addressee' onto the surface syntactic positions of the verb 'to reveal' associated with syntactic diathesis.

Reciprocal constructions can be classified in various ways. E.g., they can be sorted according to which valency complementations are put in the relation of reciprocity. Let us introduce some frequent types:

(11) **'ACTor'–'PATient'**
     (Petr a Marie)$_{rcp:ACT-PAT}$ se líbali.
     Eng. (Peter and Mary)$_{rcp:ACT-PAT}$ kissed (each other).

(12) **'ACTor'–'ADDRessee'**
     Moji rodičové$_{rcp:ACT-ADDR}$ si dávali drahé dárky.
     Eng. My parents$_{rcp:ACT-ADDR}$ gave each other expensive gifts.

(13) **'ACTor'–'ADDRessee'–'PATient'**

$(Oni)_{rcp:ACT-ADDR-PAT}$ *spolu nikdy o sobě otevřeně nehovořili.*

Eng. They$_{rcp:ACT-ADDR-PAT}$ have never talked with each other about themselves.

(14) **'ACTor'–'DIRectional:to'**

$(Oni)_{rcp:ACT-DIR3}$ *přistoupili k sobě.*

Eng. They$_{rcp:ACT-DIR3}$ have approached each other.

(15) **'ACTor'–'ORIGin'**

$(Oni)_{rcp:ACT-ORIG}$ *po sobě požadovali omluvu.*

Eng. They$_{rcp:ACT-ORIG}$ have asked apology from each other.

(16) **'ADDRessee'–'PATient'**

Petr seznámil (rodiče a svou snoubenku)$_{rcp:ADDR-PAT}$.

Eng. Petr has introduced (his parents and his fiancée)$_{rcp:ADDR-PAT}$.

The representation of syntactic diathesis. As in the case of grammatical diatheses, the changes in valency frame of verbs associated with syntactic diathesis concern only morphemic forms of the valency complementations. Similarly, these changes are regular enough to be described by syntactic rules which are stored in the grammar component of the lexicon. In the data component, only valency frames corresponding to the unmarked members of syntactic diathesis are listed. Then for each relevant lexical unit, the list of valency complementations which can be put in the symmetric relation are given in a special attribute.

For instance, the lexical unit of the verb *svěřit* 'to reveal' is represented only by the valency frame corresponding to the unmarked use. Then 'ACTor' and 'ADDRessee' which can be used reciprocally are listed in the special attribute which is ascribed to this lexical unit in the data component of the lexicon. In the grammar component, the following syntactic rule describing the changes in the surface syntactic expression of 'ADDRessee' complementation is formulated:

Rec.r	Unmarked	Marked
valency frame	$ADDR_{dat}$	$ADDR_{nom}$

Table 2. Rec.r rule for the reciprocity of 'ACTor' and 'ADDRessee'.

For the representation of other types of reciprocity, similar syntactic rules are formulated by means of which valency frames for marked members of syntactic diathesis can be derived.[3]

5   Semantic Diatheses

Semantic diatheses and their representation are widely debated in [7] and [6]. Let us briefly recapitulate their characteristics. Semantic diatheses represent relations between two lexical units of a verb which are characterized by closely related situational contents: these situational contents usually consist of the same

---

[3] A detailed description of changes in surface realization of individual complementations related to reciprocality can be found in [17].

set of situational participants. However, their relations implicate a slight seman-
tic shift. Moreover, different structural meanings, i.e., different valency frames,
characterize the lexical units involved in these relations. Let us demonstrate this
case on the pair of examples (17a)-(17b):

(17) a. *Mlynáři*.ACT-Agent *semleli zrno*.PAT-Material *na mouku*.EFF-Product – b.
      Mlynáři.ACT-Agent *semleli ze zrna*.ORIG-Material *mouku*.PAT-Product
      Eng. a. The millers.ACT-Agent ground wheat.PAT-Material into flour.EFF-Product
      – b. The millers.ACT-Agent ground flour.PAT-Product out of wheat.ORIG-Material

Both situational contents of the lexical units of the verb *semlít* 'to grind'
consist of three situational participants, which show the same semantic proper-
ties and which are related by the same relations. However, we can observe that
these relations result in different consequences: only example (17a), not (17b),
implies holistic effect of the situational participant 'Material', i.e., the interpre-
tation that the millers ground all wheat, see esp. [1] and [4]. This slight semantic
shift is manifested by the change in the mapping of the situational participants
onto the valency complementations, see Figure 3. The differences in the link-
ing results in a different surface syntactic expression of the involved situational
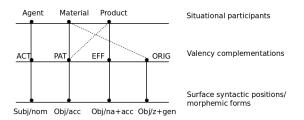participants.

Fig. 3. The changes in the mapping of the situational participants and the valency
complementations of the verb 'to grind' associated with semantic diathesis.

Let us introduce frequent types of Czech semantic diatheses, see esp. [2]:

(18) **Material-Product diathesis**
      a. *Marta nakrájela chléb*.PAT-Material *na pět silných krajíců*.EFF-Product – b.
      Marta nakrájela z chleba.ORIG-Material *pět silných krajíců*.PAT-Product
      Eng. a. Martha cut the bread.PAT-Material into five thick slabs.EFF-Product –
      b. Martha cut five thick slabs.PAT-Product from the bread.ORIG-Material
(19) **Locatum-Location diathesis**
      a. *Sedláci naložili seno*.PAT-Locatum *na vůz*.DIR3-Location – b. *Sedláci naložili
      vůz*.PAT-Location *senem*.EFF-Locatum
      Eng. a. The farmers.ACT-Agent loaded hay.PAT-Locatum onto the truck.DIR3-
      Location – b. The farmers.ACT-Agent loaded the truck.PAT-Location with hay.EFF-
      Locatum

(20) **Source-Substance diathesis**

a. *Slunce.*ACT-Source *vyzařuje teplo.*PAT-Substance – b. *Teplo.*ACT-Substance *vyzařuje ze Slunce.*DIR1-Source

Eng. a. The sun.ACT-Source radiates heat.PAT-Substance – b. Heat.ACT-Substance radiates from the sun.DIR1-Source

(21) **Bearer-Location diathesis**

a. *V chrámu.*LOC-Location *zněl sborový zpěv.*ACT-Bearer – b. *Chrám.*ACT-Location *zněl sborovým zpěvem.*PAT-Bearer

Eng. a. Choral singing.ACT-Bearer was sounding in the church.LOC-Location – b. The church.ACT-Location was sounding with choral singing.PAT-Bearer

The representation of semantic diatheses. In contrast to grammatical diatheses and syntactic diathesis, the members of semantic diatheses correspond to separate lexical units. It implies that lexical units related by a particular type of semantic diathesis are represented by separate valency frames in the data component of the lexicon. These lexical units are interlinked by a relevant type of semantic diathesis.[4] Then in the grammar component, we formulate lexical rules indicating the mapping between situational participants and valency complementations.

Let us illustrate these principles on examples (17a)-(17b). In the data component of the lexicon, the lexical unit of the verb *semlít* 'to grind' in (17a) is represented by the valency frame (A) whereas the valency frame (B) is ascribed to the lexical unit in (17b):

(A) $\text{ACT}^{obl}_{nom}\ \text{PAT}^{obl}_{acc}\ \text{EFF}^{opt}_{na+acc}$
(B) $\text{ACT}^{obl}_{nom}\ \text{PAT}^{obl}_{acc}\ \text{ORIG}^{opt}_{z+gen}$

Then in the grammar component, the lexical rule describing the changes in the mapping of the situational participants 'Material' and 'Product' onto the valency complementations is given, see Table 3.

Sem.r	Valency frame (A)	Valency frame (B)
'Material'	PAT	ORIG
'Product'	EFF	PAT

Table 3. Sem.r for the Material-Product diathesis.

Similar lexical rules can be formulated for other types of Czech semantic diatheses, see esp. [7] and [6].

---

[4] In [7] and [6], we proposed an adequate lexical-semantic representation of situational content of lexical units in the relation of semantic diathesis inspired esp. by [15]. However, the description of this representation goes beyond the scope of this paper.

6 Combination of Diatheses

In our classification, diatheses of the same type cannot be combined together.[5] However, on certain conditions, different types of diatheses, i.e. grammatical, syntactic and semantic diatheses, can be combined. For instance, in case that a particular lexical unit related with another lexical unit by a certain type of semantic diathesis fulfils morphosyntactic and semantic conditions of applying a specific grammatical meaning, this lexical unit can create the marked member of a relevant type of grammatical diathesis.

Let us turn back to the lexical units of the verb *semlít* 'to grind' related by the Material-Product semantic diathesis, see examples (17a)-(17b). The grammatical meaning captured by the value of the grammateme `diatgram` can be separately applied to these lexical units. Whereas the grammatical meanings represented by the value of the verbal grammateme `pass`, `deagent`, `rez1` and `rez2` are applicable to both perfective and imperfective lexical units (see examples (22)-(25)), the grammatical meaning `disp` is available only for the imperfective counterpart *semílat* 'to grind' (26a)-(26b). The value of the verbal grammateme `recip` is not applicable as it is conditioned by the occurrence of the situational participant 'Recipient' in the situational content of verbs.

(22) a. *(Mlynáři) bylo zrno semleto$_{pass}$ na mouku.* – b. *(Mlynáři) byla ze zrna semleta$_{pass}$ mouka.*
    Eng. a. Wheat was ground$_{pass}$ into flour (by the millers). – b. Flour was ground$_{pass}$ out of wheat (by the millers).

(23) a. *Zrno se semlelo$_{deagent}$ na mouku.* – b. *Ze zrna se semlela$_{deagent}$ mouka.*
    Eng. a. 'Wheat – *refl* – ground$_{deagent}$ – into flour.' – b. 'Out of wheat – *refl* – ground$_{deagent}$ – flour.'

(24) a. *Zrno (již) bylo semleto$_{rez1}$ na mouku.* – b. *Ze zrna (již) byla semleta$_{rez1}$ mouka.*
    Eng. a. Wheat has (already) been ground$_{rez1}$ into flour. – b. Flour has (already) been ground$_{rez1}$ out of flour.

(25) a. *Zrno (již) máme semleto$_{rez2}$ na mouku.* – b. *Ze zrna (již) máme semletu$_{rez2}$ mouka.*
    Eng. a. Wheat has (already) been ground$_{rez2}$ into flour. – b. Flour has (already) been ground$_{rez2}$ out of flour.

(26) a. *(Mlynářům) se zrno dobře semílalo$_{disp}$ na mouku.* – b *Ze zrna se (mlynářům) dobře semílala$_{disp}$ mouka.*
    Eng. a. '(For millers) – *refl* – wheat – well – ground$_{disp}$ – into flour.' – b. 'Out of wheat – *refl* – (for millers) – well – ground$_{disp}$ – flour.'

The main principles of the representation of grammatical and semantic diatheses (described in Section 3 and Section 5) remain the same: in the data component of the lexicon, two separate lexical units of the verb *semlít* 'to grind' are represented by the valency frames corresponding to the unmarked uses, see the valency frames (A) and (B) in Section 5. Then the applicability of the listed

---

[5] In contrast to [3], we do not suppose that recipient passive and deagent grammatical diatheses can be combined together. Such combination is not supported by the corpus evidence

grammatical meanings is ascribed to these lexical units separately. On the basis of the syntactic rules, stored in the grammar component, the valency valency frames describing the marked uses of the units are derived.

Furthermore, if the valency frames corresponding to these units contain valency complementations which can be symmetrically used, lexical units can be used in reciprocal constructions. Thus semantic and syntactic diatheses can be combined together as well. E.g., in case of the lexical units of the verb *semlít* 'to grind', 'ACTor' and 'BENefactor' can be put in the relation of reciprocity:

(27) a. *Mlynáři*.ACT *mu*.BEN *semleli zrno na mouku.* – b. *(Oni)*$_{rcp:ACT-BEN}$ *si (navzájem) semleli zrno na mouku.*
Eng. a. The millers.ACT ground wheat into flour for him.BEN – b. They$_{rcp:ACT-BEN}$ ground wheat into flour (for each other).

(28) a. *Mlynáři*.ACT *mu*.BEN *semleli ze zrna mouku.* – b. *(Oni)*$_{rcp:ACT-BEN}$ *si semleli (navzájem) ze zrna mouku.*
Eng. a. The millers.ACT ground flour out of wheat for him.BEN – b. They$_{rcp:ACT-BEN}$ ground flour out of wheat (for each other).

As to the combination of grammatical and syntactic diatheses, such combination is available only in cases that a lexical unit of a verb exhibits the semantic and morpho-syntactic properties satisfying conditions of deriving both (i) a marked construction of a certain type of grammatical diathesis and (ii) a reciprocal construction.

Let us demonstrate these cases on the verbs *konzultovat* 'to consult' and *vyjednávat* 'to negotiate'. Both these verbs allow to use reciprocally 'ACTor' and 'ADDRessee' (29b) and (30b), respectively. Moreover, the grammatical meaning described by the value `pass` and `disp`, respectively, of the verbal grammateme `diatgram` can be applied to these verbs (29c) and (30c), respectively. Then both linguistic means can be combined together (29d) and (30d), respectively.

(29) a. *Jednotlivé kroky jedna strana*.ACT *konzultovala*$_{act}$ *vždy se stranou druhou*.ADDR
Eng. a. The one side.ACT consulted$_{act}$ individual steps with the other side.ADDR
b. *Obě strany*$_{rcp:ACT-ADDR}$ *jednotlivé kroky vzájemně konzultovaly*$_{act}$.
Eng. b. Both sides$_{rcp:ACT-ADDR}$ consulted$_{act}$ individual steps together.
c. *Jednotlivé kroky byly s druhou stranou*.ADDR *konzultovány*$_{pass}$ *(stranou první)*.ACT
Eng. c. Individual steps were consulted$_{pass}$ with the other side.ADDR (by the one side).ACT
d. *Jednotlivé kroky byly (oběma stranami*$_{rcp:ACT-ADDR}$*) vzájemně konzultovány*$_{pass}$.
Eng. d. Individual steps were consulted$_{pass}$ (by both sides$_{rcp:ACT-ADDR}$).

(30) a. *Já*.ACT *jsem s Janem*.ADDR *vyjednával*$_{act}$.
Eng. a. I.ACT negotiated$_{act}$ with John.ADDR
b. *My*$_{rcp:ACT-ADDR}$ *jsme (spolu) vyjednávali*$_{act}$.
Eng. b. We$_{rcp:ACT-ADDR}$ negotiated$_{act}$ (with each other).
c. *Dobře se mi*.ACT *s Janem*.ADDR *vyjednávalo*$_{disp}$.
Eng. c. 'Well – *refl* – me.ACT – with John.ADDR – negotiated$_{disp}$.'
d. *Dobře se nám*$_{rcp:ACT-ADDR}$ *(spolu) vyjednávalo*$_{disp}$.
Eng. 'Well – *refl* – us$_{rcp:ACT-ADDR}$ – (together) – negotiated$_{disp}$.'

However, in some cases, although the verbs satisfy conditions of both grammatical diatheses and reciprocity, the combination of these linguistic means is

precluded. Let us exemplify this on the uses of the verb *slíbit* 'to promise' in examples (31a)-(31b), which are in the relation of recipient passive grammatical diathesis:

(31) a. *Jan.*ACT *slíbil$_{act}$ Pavlovi.*ADDR *dárek.*
      Eng. a. John.ACT promised$_{act}$ Paul.ADDR a gift.
      b. *Jan.*ADDR *dostal od Pavla.*ACT *slíben$_{recip}$ dárek.*
      Eng. b. 'John.ADDR – gave – from Paul.ACT – promised$_{recip}$ – a gift.'

      b. *Pavel.*ADDR *dostal od Jana.*ACT *slíben$_{recip}$ dárek.*
      Eng. b. 'Paul.ADDR – gave – from Jan.ACT – promised$_{recip}$ – a gift.'

      c. **(Jan a Pavel)$_{rcp:ACT-ADDR}$ dostali od sebe (navzájem) slíben$_{recip}$ dárek.*
      Eng. c. *'(John and Paul)$_{rcp:ACT-ADDR}$ – gave – from themselves – (from each other) – promised$_{recip}$ – a gift.'

Although the valency complementations 'ACTor' and 'ADDRessee' meet the condition of semantic homogeneity, they cannot be used reciprocally (31c). In case of the marked construction of recipient passive grammatical diathesis, 'Agent' (corresponding to 'ACTor') is shifted from the subject position and this position is filled by 'ADDRessee'. However, in case of reciprocally used valency complementations, the valency complementation expressed in a less prominent surface syntactic position ('ACTor' expressed in the adverbial in (31b)) would be shifted to the syntactic position of the valency complementation which occupies a more significant position ('ADDRessee' expressed in the subject in (31b)). Thus to put 'ACTor' and 'ADDResse' in reciprocity in (31b) would necessarily lead to the reshift of 'ACTor' into the subject. Such reshift would result in an ungrammatical construction (31c).

It follows that in the grammar component, it is necessary to determine the sequence of the rules which can be applied to individual lexical units so that the derivation of grammatically incorrect constructions would be prevented (see also [17]).

7   Conclusion

We have proposed a method of the representation of three types of Czech diatheses in the valency lexicon of Czech verbs, VALLEX. We have demonstrated that whereas grammatical and syntactic diatheses can be captured by syntactic rules, semantic diatheses can be represented by lexical rules. Finally, we show that on certain conditions the different types of diatheses can be combined together and that such combinations do not require any modifications of the proposed representation. The only necessary enhancement consists in a precise determination of the sequence of the syntactic rules. As to the future work, we intend to further examine the combinations of different types of diatheses.

Bibliography

[1] Anderson, S. R. (1971). On the role of deep structure in semantic interpretation. *Foundations of Language*, (7):387–396.

[2] Daneš, F. (1985). *Věta a text: studie ze syntaxe současné češtiny*. Academia, Praha.

[3] Daneš, F., Grepl, M., and Hlavsa, Z., editors (1987). *Mluvnice češtiny 3*. Academia, Praha.

[4] Dowty, D. (1991). Thematic proto-roles and argument selection. *Language*, 67:547–619.

[5] Kettnerová, V. and Lopatková, M. (2009). Changes in valency structure of verbs: Grammar vs. lexicon. In Levická, J. and Garabík, R., editors, *Slovko 2009, NLP, Corpus Linguistics, Corpus Based Grammar Research*, pages 198–210, Bratislava, Slovakia. Slovenská akadémia vied.

[6] Kettnerová, V. and Lopatková, M. (2010a). Representation of changes in valency structure of verbs in the valency lexicon of czech verbs. In Bertinetto, P. M. et al., editor, *Proceedings of Verb 2010, Interdisciplinary Workshop on Verbs, The Identification and Representation of Verb Features*, pages 154–159, Italy, Pisa.

[7] Kettnerová, V. and Lopatková, M. (2010b). The representation of diatheses in the valency lexicon of czech verbs. In Loftsson, H. et al., editor, *Proceedings of the 7th International Conference on Advances in Natural Language Processing (IceTAL 2010)*, pages 185–196, Berlin / Heidelberg. Springer.

[8] Kováčová, K. (2005). *Konverzívnost jako systémový vztah*. PhD thesis, Charles University in Prague, Prague.

[9] Lopatková, M., Žabokrtský, Z., and Kettnerová, V. (2008). *Valenční slovník českých sloves*. Nakladatelství Karolinum, Praha.

[10] Mel'čuk, I. A. (2004). Actants in syntax and semantics. *Language*, 12:1–66.

[11] Panevová, J. (1999). Česká reciproční zájmena a slovesná valence. *Slovo a slovesnost*, 90:269–275.

[12] Panevová, J. (2007). Znovu o reciprocitě. *Slovo a slovesnost*, 68:91–100.

[13] Panevová, J. and Ševčíková, M. (2010). Annotation of morphological meanings of verbs revisited. In *Proceedings of the 7th International Conference on Language Resources and Evaluation (LREC 2010)*, pages 1491–1498, Valletta, Malta. European Language Resources Association.

[14] Panevová, J. et. al (manuscript). *Syntax současné češtiny (na základě anotovaného korpusu)*. Nakladatelství Karolinum, Praha.

[15] Rappaport Hovav, M. and Levin, B. C. (1998). Building verb meanings. In Butt, M. and Geuder, W., editors, *The Projection of Arguments. Lexical and Compositional Factors*, pages 98–134. CSLI Publications, Stanford.

[16] Sgall, P., Hajičová, E., and Panevová, J. (1986). *The Meaning of the Sentence in Its Semantic and Pragmatic Aspects*. Reidel, Dordrecht.

[17] Urešová, Z. (manuscript). *Valence sloves v Pražském závislostním korpusu*. PhD thesis, Charles University in Prague, Prague.