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Reflexives in the VALLEX Lexicon: Syntactic Reflexivity and Reciprocity

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Abstract

Reflexives, encoding a variety of meanings, pose a great challenge for both theoretical and lexicographic description. As they are associated with changes in morphosyntactic properties of verbs, their description is highly relevant for verb valency. In Czech, reflexives function as the reflexive personal pronoun and as verbal affixes. In this paper, we address those language phenomena that are encoded by the reflexive personal pronoun, i.e., *reflexivity* and *reciprocity*. We introduce the lexicographic representation of these two language phenomena in the *VALLEX* lexicon, a valency lexicon of Czech verbs, accounting for the role of the reflexives with respect to the valency structure of verbs. This representation makes use of the division of the lexicon into a data component and a grammar component. It takes into account that reflexivity and reciprocity are conditioned by the semantic properties of verbs on the one hand and that morphosyntactic changes brought about by these phenomena are systemic on the other. About one third of the lexical units contained in the data component of the lexicon are assigned the information on reflexivity and/or reciprocity in the form of pairs of the affected valency complementations (2,039 on reflexivity and 2,744 on reciprocity). A set of rules is formulated in the grammar component (3 rules for reflexivity and 18 rules for reciprocity). These rules derive the valency frames underlying syntactically reflexive and reciprocal constructions from the valency frames describing non-reflexive and non-reciprocal constructions. Finally, the proposed representation makes it possible to determine which lexical units of verbs create ambiguous constructions that can be interpreted either as reflexive or as reciprocal.

1. Introduction

According to Genuišině (1987, p. 25), the term *reflexive marker*, in this paper simply referred to as a *reflexive*, can be broadly defined as „an element in the verb (affix, ending, etc.) or its environment (particle, pronoun etc.) which has (or once had) a reflexive meaning (of coreference of two semantic roles) as its only or one of many functions“. In various languages, reflexives are involved in a variety of meanings. Due to their high ambiguity, both theoretical and lexicographic description of their functions pose a great challenge. As the meanings encoded by reflexives are primarily associated with changes in the morphosyntactic properties of verbs, they are highly relevant for the description of verb valency.

In Czech, the clitic forms (*se, si*) and the full forms of reflexives (*sebe, sobě, sebou*) are available.¹ Both types then occur in various patterns, which are not always easily distinguishable from each other (see esp. Panevová, 2008; Fried, 2007; Kettnerová and Lopatková, 2019). Two main functions of the reflexives can be identified: while the full reflexives have a pronominal function, the clitic reflexives can serve as both a pronoun and a verbal affix,² cf. German *sich* (Gast and Hass, 2008) and Polish *się* (Wiemer, 2007). The pronominal reflexives mark conventionalized syntactic constructions encoding reflexivity (1) and reciprocity (2). The clitic reflexives with the function of the verbal affix are then part of verb forms (3) or of verb lemmas (4).

- (1) a. *Nenáviděla sebe a své tělo.*³
 ‘She hated herself and her body.’
 b. *..., a nenáviděl se za to.*
 ‘..., and he hated himself for it.’
- (2) a. *... a ze všeho nejvíc začnou nenávidět sebe navzájem.*
 ‘... and most of all they start hating each other.’
 b. *Byli tu lidé, kteří se dokonce vzájemně nenáviděli, ...*
 ‘There were people here who even hated each other, ...’
- (3) a. *Platýz se dusil spolu s pórkem zabalený v alobalu v troubě ...*
 ‘The flounder was stewed with leeks wrapped in foil in the oven ...’
- (4) a. *Pes se dusil a koulel očima.*
 ‘The dog was choking, rolling its eyes.’
 b. *Nikdy si nehrála s panenkami, ...*
 ‘She never played with dolls, ...’

¹ Further, there is the reflexive possessive pronoun *svůj* available in Czech. In this paper, we leave it aside as it cannot occupy a valency position of verbs.

² However, the interpretation of the clitic reflexives as a pronoun is not accepted by some scholars (see Section 3).

³ Unless explicitly stated otherwise, all examples come from the Czech National Corpus, subcorpus SYNv8.

In this paper, we investigate the *language phenomena encoded by the reflexive personal pronoun*, i.e., *reflexivity* and *reciprocity*. Czech – like other Slavic languages – exhibits so-called reflexive-reciprocal ambiguity, i.e., it uses the reflexives for encoding both reflexivity and reciprocity (Nedjalkov, 2007). We introduce the lexicographic representation of these two language phenomena in the VALLEX lexicon, a valency lexicon of Czech verbs, accounting for the role of the reflexives with respect to the valency structure of verbs. This representation makes use of the division of the lexicon into a data component and a grammar component (Lopatková et al., 2016), taking into account that reflexivity and reciprocity are – to a great extent – conditioned by the semantic properties of verbs on the one hand and the systemic nature of the morphosyntactic changes associated with these phenomena on the other.

The paper is structured as follows. Section 2 provides a brief overview of the VALLEX lexicon and the Functional Generative Description, representing its theoretical background. Section 3 sketches approaches to the reflexives *se*, *si* in Czech linguistics. Section 4 introduces theoretical findings on reflexivity in Czech and presents its lexicographic representation in the data and the grammar component of the VALLEX lexicon, including basic statistics related to this phenomenon. Section 5 deals in the same way with reciprocity. Finally, reflexive-reciprocal ambiguity in Czech and its lexicographic treatment in VALLEX are described in Section 6.

2. VALLEX Lexicon and Functional Generative Description

Valency, the ability of verbs (and some nouns, adjectives and adverbs) to open a certain number of valency positions for dependent units (here referred to as *valency complementations*), forms the core of the sentence structure. As the information on valency cannot be inferred on the basis of general rules, it should be systematically described in a lexicon. VALLEX represents such a lexicon, providing a comprehensive description of valency behavior of Czech verbs.⁴ VALLEX is theoretically rooted in the valency theory of the Functional Generative Description (FGD; see esp. Sgall et al., 1986; Panevová, 1974–75, 1994).

Valency is a deep-syntactic characteristic of the verb and as such it is captured in FGD on the *tectogrammatical layer* (the layer of linguistically structured meaning). However, valency has a specific impact on lower layers as well. Two kinds of valency complementations of a verb are distinguished – *actants* (roughly corresponding to arguments) and *free modifications* (roughly corresponding to adjuncts). In addition, a third group of so-called *quasi-actants* is identified, which shares some characteristics with actants and others with free modifications (Lopatková and Panevová, 2006).

Five *actants* have been identified in FGD: ‘Actor’ (henceforth **ACT**), ‘Addressee’ (**ADDR**), ‘Patient’ (**PAT**), ‘Origin’ (**ORIG**), and ‘Effect’ (**EFF**). Actants, corresponding to the surface subject and to direct and indirect objects, are distinguished primarily

⁴ <http://hdl.handle.net/11234/1-3524>

on a syntactic basis. *Free modifications*, corresponding to adverbials, are determined on a semantic basis (e.g., **DIR3** ‘where to’, **TWHEN** ‘when’).

All three types of valency complementations can be either obligatory or optional, their obligatoriness tested by the so-called dialogue test (Panevová, 1974–75). Actants and quasi-actants (be they obligatory or optional) and obligatory free modifications form the so-called standard *valency frame*, characterizing individual lexical units of verbs, i.e., their individual senses. The valency frame consists of a set of valency slots, each corresponding to a single valency complementation. Each slot is characterized by a label marking the relation of the complementation to its governing verb (e.g., **ACT** or **DIR3**), by information on its obligatoriness and on possible morphemic forms determining its surface expression.⁵

To capture valency changing phenomena, such as diatheses, reflexivity, reciprocity, and semantic alternations, *VALLEX* makes use of the division of the lexicon into a *data component* (providing information specific to individual lexical units of verbs in their active, non-reflexive and non-reciprocal uses) and into a *grammar component* (capturing regular valency changes related to diatheses, reflexivity and reciprocity in the form of formal rules); see Lopatková et al. (2016). *VALLEX* thus reflects the fact that valency-related phenomena are typically conditioned by the semantic properties of verbs (and thus must be listed in the form of lexicon entries characterizing their individual lexical units) on the one hand and the fact that morphosyntactic changes brought about by these phenomena are systemic on the other.

In the description of valency changing phenomena, an abstract model of a *situation denoted by a lexical unit of a verb*, as proposed by Apresjan (1992) and by Mel’čuk (2004), has proved useful. This model presupposes that such a situation is delineated by a certain number and type of *semantic (situational) participants* that characterize the lexical unit of the verb in a unique way. As no precise metalanguage for their description has been set up, these participants are labeled with intuitively delimited semantic roles. As shown in more detail in Sections 4 and 5, this model makes it possible to identify the mapping between semantics and deep and surface syntax, and thus to pinpoint the main characteristics of changes associated with individual valency changing phenomena (see Kettnerová, 2014, as well).

⁵ Morphemic forms of individual actants and quasi-actants are determined by their governing verbs and as such they are not easily predictable even within individual semantic groups of verbs. As a result, they should be listed for each actant and quasi-actant separately. With free modifications, morphemic forms are not listed as they are implied by their semantics.

3. Reflexives in Czech

Reflexivity (in a broad sense) covers all uses of verbs marked by the reflexive. In Czech, the clitic forms *se/si* and the full forms *sebe/sobě/sebou* of the reflexive are available.⁶ While the pronominal character of the latter is unquestionable, the status of the clitic reflexives raises controversy. Some scholars deny the pronominal status of the clitic reflexives on the basis of their morphosyntactic behavior (see esp. Karlík, 1999; Oliva, 2000, 2001; Esvan, 1997; Veselý, 2018). For example, the clitic reflexives fuse with the verb forms of the 2nd singular of the past tense (5-a) and of the conditional (5-b), they cannot occur in coordination (5-c) and cannot be used in ellipses (5-d).⁷ From this point of view, the clitic reflexives can only be interpreted as verbal affixes.

- (5) a. *Myl ses už?* (made-up)
 ‘Have you washed yourself already?’
 b. *Chceš říci, že by ses nebránil, kdyby ti někdo bral, co ti patří?*
 ‘Do you want to say that you would not defend yourself if somebody took what is yours?’
 c. *Lehce zranil sebe/*se i spolujezdkyni.*
 ‘He slightly injured himself as well as his co-driver.’
 d. *Jaký největší dar jsi mu dala? Sebe./*Se.*
 ‘What is the greatest gift you have given him? Myself.’

Other linguists, however, argue that the clitic reflexives act as verbal affixes in some constructions and as the reflexive personal pronoun in others. The clitic reflexives of the latter type – similar to the full reflexives – mark the referential identity of the valency complementation occupied by the reflexive and another valency complementation, typically the one expressed in the subject position. Those clitic reflexives are then classified as the reflexive pronoun that are substitutable by their respective full forms (see esp. Komárek et al., 1986; Komárek, 2001; Panevová, 2001, 2008). This view is justified by the fact that the choice between the clitic and full form of the reflexive is conditioned by changes in the topic-focus articulation, rather than by a referential difference between them (Fried, 2004, 2007). With respect to changes in the topic-

⁶ Besides verbs, the full forms of the reflexive can also appear with nouns (e.g., *jeho strach o sebe* ‘his worry about himself’), with adjectives (e.g., *hrdý na sebe* ‘proud of himself’) and with adverbs (e.g., *kolmo na sebe* ‘perpendicularly to each other’). The clitic reflexives can sporadically mark also verbal nouns denoting actions (e.g., *stýskání (si)* ‘complaining’), see esp. Veselovská (2001), and adjectives formed from transgressives (*stýskající (si) žena* ‘the complaining woman’).

⁷ Thanks to one of the reviewers for pointing out that haplology, to which the clitic reflexives are typically subject (in contrast to the full forms), can be seen as one such feature as well (e.g., compare *Snaží se umýt.* ‘He/she tries to wash himself/herself.’ with *se* belonging to both verbs and the sentence with the full reflexive *Snaží se umýt sám sebe.* ‘He/she tries to wash himself/herself.’). For haplology of the reflexives in Czech see esp. Rosen (2014).

focus articulation, the reflexive pronoun then behaves like other personal pronouns, compare examples (6-a) and (6-b).

- (6) a. *Sebe/Jeho/Tebe nenávidím.* (made-up)
 b. *Nenávidím se/ho/tě.* (made-up)
 'I hate myself/him/you.'

Here we adopt the latter view as it allows us to treat semantically equivalent constructions that differ only in the form of the reflexive in the same manner.

4. Syntactic Reflexivity

Languages typically have at their disposal some linguistic means for expressing the situation where an entity (typically of an animate and volitive nature) acts on himself/herself (see esp. Faltz, 1985; Frajzyngier and Walker, 2000b).⁸ This situation can be referred to as a reflexive situation. The reflexive situation thus requires at least a binary predicate where two of its valency complementations, corresponding to two distinct semantic participants, refer to the same entity (which is either singular or plural). The reflexive situation can be exemplified by the scheme in Figure 1 with the verb *vidět* *impf* 'to see'.

Conventionalized constructions expressing a reflexive situation are called here *syntactically reflexive constructions*.⁹ In these constructions, the reflexive (of both clitic and full forms) has a pronominal status (see Section 3), marking referential identity of a participant expressed in the valency position occupied by this reflexive personal pronoun and a participant in another valency position.¹⁰ The latter position predominantly involves the subject (henceforth referred to as *subject-oriented syntactic reflexivity*), see example (7-a). In rare cases, the direct or indirect object position is affected (henceforth *object-oriented syntactic reflexivity*), see examples (7-b) and (7-c). As a result, the two valency complementations onto which these participants are mapped corefer with each other.

⁸ König and Gast (2008) delimit reflexivity on the basis of the so-called reflexive predicate, i.e., a binary predicate R acting on a set A and meeting the following formula:

$$\forall x \in A [R(x, x)]$$

Further, they extend the notion of reflexivity to predicates with more than two arguments, two of which are instantiated by the same participant.

⁹ See also footnote 23 for the distinction between the reflexivization as a syntactic operation and the reflexivization as a word formation process.

¹⁰ This issue has been extensively discussed esp. within the binding theory proposed by Chomsky (1981) and further elaborated, e.g., by Reinhart and Reuland (1993) and by Reuland and Everaert (2001). Within the principles and parameters framework, reflexivity – with respect to the role of the lexicon in the linguistic description – has been discussed by Reinhart and Siloni (2005) as well.

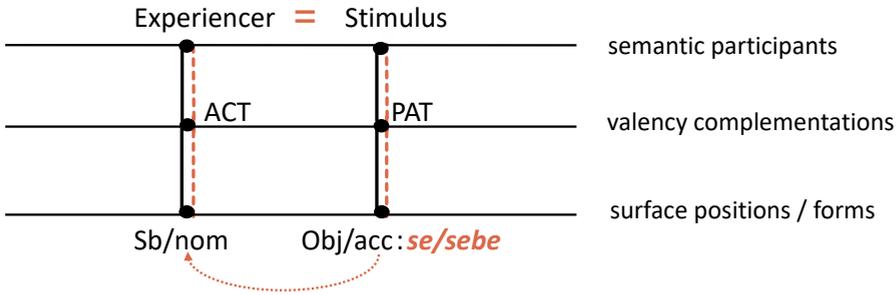


Figure 1. The mapping of semantic participants, valency complementations and surface positions in an example of syntactic reflexivity affecting *ACT* and *PAT* of the verb

vidět *impf*: Petr.*ACT* se.*PAT* viděl (v zrcadle).

≈ Petr.*ACT* viděl sám sebe.*PAT* (= Petra) v zrcadle.

'Peter saw himself in the mirror.'

- (7) a. *To, že muž na sebe doma nedbá, je jedním ze zdrojů problémů v partnerském soužití.*
 'The fact that a man does not care about himself at home is one of the sources of problems in partners' lives.'
- b. *Ale ochraňoval ji i před sebou samou.*
 'But he also protected her from herself.'
- c. *Jana cítí, jak mu na sobě samém záleží.* (modified)
 'Joan feels how much he cares about himself.'

Syntactically reflexive constructions result from the syntactic operation of *syntactic reflexivization*, making use of the reflexive personal pronoun as its primary linguistic marker. The operation is applied to the valency frames underlying non-reflexive constructions and it affects pairs of valency complementations (corresponding to two separate but referentially identical semantic participants). The changes in the lexical and morphosyntactic expression of the valency complementations involved in reflexivity are regular enough to be described by formal rules (see Section 4.2).

The changes in the lexical expression of valency complementations concern the use of the reflexive personal pronoun. The morphosyntactic changes are restricted to the agreement of predicative complements (referred to as complements or verbal attributes in FGD) in syntactically reflexive constructions marked by the clitic reflexive *se*. In these constructions, the predicative complement typically agrees with the nominative subject, as exemplified in (8-a) with the predicative complement *jako outsider* 'as an outsider' agreeing with the pro-dropped subject. In limited cases, the predicative complement can agree with the accusative clitic reflexive *se* as well (i.e., the

agreement is the same as for the full reflexive *sebe*). Compare (8-b) with the predicative complement *jako studenta* ‘as a student, agreeing with the direct object expressed by the accusative clitic reflexive *se*, and its modification (8-c) with the full reflexive in the accusative *sebe*, exhibiting the same agreement.¹¹

- (8) a. *Když byla menší, viděla se_{acc} jako outsider_{nom} ...*
 ‘When she was smaller, she saw herself as an outsider ...’
- b. *V nejranější revoluční vzpomínce z následujících dní se_{acc} vidím jako studenta_{acc} 1. ročníku gymnázia ...*
 ‘In the earliest revolutionary memory of the following days, I see myself as a first-year grammar school student ...’
- c. *V nejranější revoluční vzpomínce z následujících dní vidím sebe_{acc} jako studenta_{acc} 1. ročníku gymnázia ... (modified)*

4.1. Syntactic Reflexivity in the Data Component

In the data component of the *VALLEX* lexicon, the attribute *reflex*, which is assigned to individual lexical units of verbs, captures the information on syntactic reflexivity in the form of pairs of the valency complementations affected by reflexivity (this applies to 2,039 lexical units in total, represented by 2,291 verb lemmas in *VALLEX*). This information is limited to actants, quasi-actants and obligatory free modifications.¹²

Subject and object-oriented reflexivity are not explicitly distinguished since this distinction follows from morphemic forms of the valency complementations involved in reflexivity. Subject-oriented reflexivity is much more frequent in the *VALLEX* data than object-oriented reflexivity: there are 2,255 attested pairs of valency complementations allowing for the former type of reflexivity and 16 attested pairs allowing for the latter one.

¹¹ The changes in agreement of predicative complements are often taken as evidence that the clitic reflexive has the role of the verbal affix intransitivizing the verb (e.g., Veselý, 2018).

¹² Optional free modifications, standing outside the so-called standard valency frame, can be affected by syntactic reflexivity as well; see, e.g., the sentence *Ostatní vojáci_{ACT} si_{BEN} chystali snídani, balili si_{BEN} věci ...* ‘The other soldiers were preparing their breakfast, packing their things ...’, in which the actant *ACT* and the optional free modification *BEN* are involved in reflexivity. Although these cases were not annotated (as optional free modifications are not systematically captured in *VALLEX*), we expect that reflexivity affecting optional free modifications is governed by the same principles as reflexivity of actants, quasi-actants and obligatory free modifications.

Examples (9-a) to (9-c) provide the three most frequent pairs of valency complementations involved in *subject-oriented syntactic reflexivity*, as attested in VALLEX.¹³ In these constructions, one of the valency complementations, typically ACT, is expressed by the (nominative) subject. The other complementation, being filled by the reflexive personal pronoun, can be expressed on the surface either as the (accusative) direct object (9-a), as an indirect object (9-b), or as an adverbial (9-c). The following prepositionless and prepositional cases are attested with actants and quasi-actants in the data:¹⁴ 2, 3, 4, 7, do+2, k+3, mezi+4, na+4, na+6, nad+7, o+4, o+6, od+2, po+6, podle+2, pro+4, proti+3, před+4, před+7, při+6, s+7, u+2, v+4, v+6, z+2, za+4, za+7.¹⁵

- (9) a. *naštvat*^{pf} ‘to make angry’ ... ACT₁ PAT₄
 reflex: ACT–PAT
Naposledy jsem naštvál já_{ACT} sám sebe_{PAT}.
 ‘Last time I made myself angry.’
- b. *dokazovat*^{impf} – *dokázat*₁^{pf} ‘to prove’ ... ACT₁ ADDR₃ PAT_{4,zda,že,cont}
 reflex: ACT–ADDR
Češi mají menší potřebu dokazovat si_{ADDR} svou svébytnost.
 ‘Czechs have less need to prove their independence to themselves.’
- c. *mířit*^{impf} ‘to aim’ ... ACT₁ PAT_{4,7} DIR₃
 reflex: ACT–DIR₃
Pistolí mířil střídavě (na sebe, na policistu a zase na sebe)_{DIR3}, ...
 ‘He aimed his pistol alternately at himself, at the policeman, and at himself again, ...’

¹³ Eight different pairs of valency complementations that can be affected by subject-oriented reflexivity are contained in the data – four pairs of actants (the left column), one pair of an actant and a quasi-actant (the middle column), and three pairs of an actant and a free modification (the right column):

ACT–PAT	1,543	ACT–OBST	3	ACT–DIR ₃	106
ACT–ADDR	468			ACT–DIR ₁	31
ACT–EFF	43			ACT–LOC	22
ACT–ORIG	39				

¹⁴ Morphemic forms of free modifications are not explicitly indicated in VALLEX as they are implied by the semantic type of the complementation, see also footnote 5.

In the VALLEX notation, numbers stand for morphological cases (1=nominative, 2=genitive, 3=dative, 4=accusative, 6=locative, 7=instrumental); in the case of prepositional groups, the preposition precedes the number indicating the respective case (prepositions are not translated here as they can have various interpretations depending on their governing verbs). Further, clausal complementations are marked by the respective subordinating conjunction (e.g., *aby* ‘in order to’, *zda* ‘whether’, *že* ‘that’); the abbreviation *cont* stands for a clausal complementation introduced by an interrogative pronoun or an interrogative adverb.

¹⁵ As for the frequency of individual morphemic forms, prepositionless cases are attested with 1,519 LUs (1,054 accusatives, 402 datives, 40 instrumentals, and 38 genitives; more than one of these forms can express a single affected valency complementation) and 661 LUs fall into the listed prepositional cases (the most frequent being *o*+6 (159 LUs), *na*+4 (158 LUs), and *s*+7 (110 LUs)).

Object-oriented syntactic reflexivity is rather rare, see examples (10-a) to (10-c), illustrating pairs of valency complementations involved in this type of reflexivity.¹⁶ As for their surface realization, two options occur in the VALLEX data. First, in most cases, one of the valency complementations affected by syntactic reflexivity is expressed as the (accusative) direct object, and the other, which is filled by the reflexive personal pronoun, is realized as an indirect object (10-a) or as an adverbial (10-b), both expressed by a prepositional case.¹⁷ Second, both complementations involved in reflexivity are expressed on the surface as indirect objects: the first one in the dative, and the other, filled by the reflexive personal pronoun, in a prepositional case (10-c), forming thus a subjectless construction. The following prepositional cases of the valency complementation occupied by the reflexive pronoun are attested in the VALLEX data: *do*+2, *na*+6, *o*+4, *o*+6, *od*+2, *proti*+3, *před*+7, *s*+7, *v*+4.¹⁸

- (10) a. *uchránit*^{pf} ‘to protect’ ... ACT₁ PAT₄ EFF_{od+2,proti+3,před+7,aby}
 reflex: PAT–EFF
Že nás.PAT pomocí blažené relaxace uchrání před sebou.EFF samými.
 ‘That they will protect us from ourselves by blissful relaxation.’
- b. *dovádět*^{impf} – *dovést*₁^{pf} ‘to bring’ ... ACT₁ PAT₄ DIR3
 reflex: PAT–DIR3
Meditace mě.PAT ale dovedla k sobě.DIR3 samému, ...
 ‘Meditation, however, brought me to myself, ...’
- c. *záležet*^{impf} ‘to care’ ... ACT₃ PAT_{na+6,aby}
 reflex: ACT–PAT
Dávejte okolí najevo, že vám.ACT na sobě.PAT záleží.
 ‘Show people around you that you care about yourself.’

If a lexical unit of a verb allows more than one pair of its valency complementations to be involved in syntactic reflexivity, more than one attribute *reflex* is assigned to the lexical unit, distinguished by Arabic numerals. From 2,039 lexical units with the

¹⁶ The following pairs are attested in the VALLEX data (four pairs of actants in the left two columns and one pair of an actant and a free modification in the right column):

PAT–EFF	6	ACT–PAT	3	PAT–DIR3	2
ADDR–PAT	4	ACT–ADDR	1		

¹⁷ VALLEX attests the only verb *připomínat*^{impf} – *připomenout*^{pf} for which it is the other way around, i.e., the coreferred valency complementation is expressed as the dative indirect object and the one occupied by the reflexive pronoun as the direct object, see the following example:

reflex: ADDR–PAT

Jejich majitelé chtějí mít doma tvora, který jim.ADDR připomíná sebe.PAT sama nebo jiného člověka.

‘Their owners want to have a creature at home that reminds them of themselves or of another person.’

¹⁸ With 16 LUs allowing for object-oriented reflexivity, the prepositional cases *od*+2 and *před*+7 appear with 4 LUs, *o*+6 and *proti*+3 with 3 LUs, others are attested for just 1 or 2 LUs.

attribute reflex, 232 can have more than one pair of their valency complementations affected by reflexivity. For example, with the verb *ochraňovat*^{impf} – *ochránit*^{pf}, three pairs of its valency complementations can be affected by syntactic reflexivity. Two of them exemplify subject-oriented reflexivity, see examples (11-a) and (11-b), and one falls under object-oriented reflexivity, see example (11-c).

- (11) *ochraňovat*^{impf} – *ochránit*^{pf} ‘to protect’ ... ACT₁ PAT₄ EFF_{od+2,proti+3,před+7}
- a. reflex1 : ACT–PAT
Před rakovinou se.PAT člověk.ACT může ochránit z velké části sám.
 ‘A person can himself/herself protect himself/herself from cancer for the most part.’
- b. reflex2 : ACT–EFF
 ..., protože on.ACT ji před sebou.EFF samým ochránit nemůže.
 ‘..., because he cannot protect her from himself.’
- c. reflex3 : PAT–EFF
 ... snaha ochránit nás.PAT před sebou.EFF samými.
 ‘... attempt to protect us from ourselves.’

4.2. Syntactic Reflexivity in the Grammar Component

Two basic rules are formulated for syntactic reflexivity: one for subject-oriented syntactic reflexivity and the other for object-oriented reflexivity. Both these rules, applied to the valency frames of verbs underlying their non-reflexive constructions, allow the valency frames describing their reflexive constructions to be derived. Further, the basic rule for subject-oriented reflexivity is complemented by a supplementary rule, describing changes in agreement of predicative complements.

This supplementary rule is applied to the valency frames resulting from the basic rule.

Each rule consists of three sections (see Figures 2, 3 and 4):

A header identifies the rule.

Conditions indicate properties that a lexical unit of a verb and its valency frame must have so that the rule can be applied. Two properties are relevant here:

- First, the lexical unit must be characterized by the attribute reflex, identifying the pair of the valency complementations affected by reflexivity; these complementations are represented by variables X and Y in the case of subject-oriented reflexivity (with X reserved for the nominative complementation) and by Y and Z in the case of object-oriented reflexivity.
- Second, in the basic rules, the valency complementations X in the case of subject-oriented reflexivity and Y in the case of object-oriented reflexivity are restricted by morphemic forms introduced in their subscripts. Further, the supplementary rule restricts the surface form of the complementation Y

to the reflexives *se*, *sebe* and the morphemic forms of **Z** to the forms that follow the subordinate conjunction *jako* introducing predicative complements.

A set of actions indicates changes in the valency frames of verbs necessary to generate frames underlying their syntactically reflexive constructions. Two changes are relevant here:

- First, the valency complementation **Y** in the case of subject-oriented reflexivity and **Z** in the case of object-oriented reflexivity must be filled by the reflexive personal pronoun in the respective morphemic form prescribed for this complementation: the abbreviation REFL is used for the form of the reflexives specified in the subscript by the variable form (standing for both prepositionless and prepositional cases). Other possible morphemic forms of the respective valency complementation, if present in the valency frame, are deleted. Further, agreement of the predicative complement is changed.
- Second, the rules stipulate that in syntactically reflexive constructions, both affected valency complementations must be obligatorily present in the deep structure. As for the surface structure, **X** in the subject position can be elided; other affected complementations (**Y** in subject-oriented reflexivity and both **Y** and **Z** in object-oriented reflexivity) must be present in the surface structure of reflexive constructions.

If more than one prepositionless or prepositional cases are listed for the valency complementation **Y** in the case of subject-oriented reflexivity and **Z** in the case of object-oriented reflexivity, the respective basic rule is applied repeatedly, generating more than one valency frame.

Rules for subject-oriented reflexivity

Subject-oriented syntactic reflexivity		reflex_basic_subj
reflex:	X - Y X ₁ & Y	
Y	form → REFL _{form} other forms → ∅	
obligatoriness	X , Y	

Figure 2. The basic rule *reflex_basic_subj* indicating changes in valency frames of verbs in the case of subject-oriented reflexivity.

The basic rule *reflex_basic_subj*, given in Fig. 2, captures all cases of subject-oriented reflexivity recorded in the VALLEX data, namely it is applied to 2,255 pairs of valency complementations in 2,032 lexical units in VALLEX.

Let us use one of the lexical units of the verb *vnímat^{impf}* ‘to perceive’ to exemplify the application of the rule *reflex_basic_subj*. It is determined in the data component of the lexicon that two of its actants, **ACT** and **PAT**, see its valency frame in (12), can be affected by reflexivity, i.e., they can refer to the same entity. As **ACT** has the nominative form, the *reflex_basic_subj* rule is employed to generate the valency frame underlying the reflexive construction, with **X** instantiated as **ACT**₁, and **Y** as **PAT**_{4,že}. In line with the rule, the accusative **PAT** is filled by the clitic or full form of the reflexive pronoun in the accusative (*se, sebe*). The remaining form (the subordinating conjunction *že*) is then deleted as it cannot appear in syntactically reflexive constructions, see the resulting valency frame in (13) underlying the reflexive constructions. Both **ACT** and **PAT** must be present in the deep syntactic structure of reflexive constructions. As for the surface, while **ACT** can be elided (as Czech is a pro-drop language), **PAT** must be present on the surface, otherwise the resulting constructions would not have the reflexive meaning, see examples (13-a) and (13-b). The form of **EFF**, realized on the surface as a predicative complement, is not affected; hence it still agrees with **PAT** in the accusative. Compare the expression *jako dobrodruha a psance* ‘as an adventurer and outlaw’ in the example in (12) on the one hand and in (13-a) on the other.

- (12) *vnímat^{impf}* ‘to perceive’ ... **ACT**₁ **PAT**_{4,že} **EFF**_{jako+4,jako+adj-4}
 reflex: **ACT**–**PAT**
Vnímal ho.PAT.acc (jako dobrodruha a psance).EFF.acc. (modified)
 ‘He perceived him as an adventurer and outlaw.’
- (13) **ACT**₁ **PAT**_{se,sebe} **EFF**_{jako+4,jako+adj-4}
- ... *a sám sebe.PAT.acc vnímal (jako dobrodruha a psance).EFF.acc.*
 ‘... and he perceived himself as an adventurer and outlaw.’
 - ... *chvíle, kdy se.PAT.acc vnímám především (jako triatlonistu (byť bývalého)).EFF.acc.*
 (Araneum Bohemicum)
 ‘... times when I perceive myself primarily as a triathlete (even a former one).’

Generating the valency frame underlying the reflexive construction with a predicative complement in the nominative requires the application of the supplementary rule *reflex_compl_se*, given in Fig. 3. This rule is applied to the valency frame (13), which is an output of the basic rule. The **PAT** with the form *se, sebe* is identified as **Y** and **EFF** with the form *jako+4, jako+adj-4* as **Z**. The rule then stipulates that **PAT** is restricted to the clitic reflexive *se* and the forms *jako+1, jako+adj-1* are added to the list of possible expressions of **EFF**, see the resulting valency frame in (14). Compare the nominative

Subject-oriented syntactic reflexivity		reflex_compl_se
reflex:	X-Y	
	Y _{se, sebe} & Z _{jako+4, jako+adj-4} [EFF COMPL] [†]	
Y	se, sebe → se	
Z	jako+4 → jako+1, jako+4 jako+adj-4 → jako+adj-1, jako+adj-4	

[†] The rule limits the variable **Z** to the complementations **EFF** and **COMPL** corresponding to predicative complements.

Figure 3. The supplementary rule *reflex_compl_se* for subject-oriented reflexivity.

form *jako triatlonista* (*byť bývalý*) in (14) and the accusative form *jako triatlonistu* (*byť bývalého*) in (13-b).

- (14) **ACT**₁ **PAT**_{se} **EFF**_{jako+1,jako+4,jako+adj-1,jako+adj-4}
 ... *chvíle, kdy se.PAT.acc vnímám především (jako triatlonista (byť bývalý)).EFF.nom.*
 (modified)
 '... times when I perceive myself primarily as a triathlete (even a former one).'

The supplementary rule *reflex_compl_se* is applied to 39 lexical units in *VALLEX*.

Rule for object-oriented reflexivity

Reflexive constructions falling under object-oriented reflexivity are described by valency frames generated by the rule *reflex_basic_obj*, given in Fig. 4. This rule covers all cases of object-oriented reflexivity recorded in the *VALLEX* data, namely it is applied to 16 pairs of valency complementations in 16 lexical units in *VALLEX*.

For example, to generate the valency frame underlying the reflexive construction of the verb *smiřovat*^{impf} – *smiřit*^{pf} 'to reconcile' in (16), the rule *reflex_basic_obj* is applied to the valency frame (15) for non-reflexive constructions of the verb, see the example in (15). The rule identifies the accusative **PAT** as the variable **Y** and **ADDR** as **Z**; the output valency frame is provided in (16).

- (15) *smiřovat*^{impf} – *smiřit*^{pf} 'to reconcile' ... **ACT**₁ **ADDR**_{s+7} **PAT**₄
 reflex: **ADDR**–**PAT**
Náboženství je cokoliv, co tě.PAT smiřuje se světem.ADDR. (modified)
 'Religion is anything that reconciles you with the world.'
- (16) **ACT**₁ **ADDR**_{se sebou} **PAT**₄
Náboženství je cokoliv, co tě.PAT smiřuje se sebou.ADDR samým.
 'Religion is anything that reconciles you with yourself.'

Object-oriented syntactic reflexivity		reflex_basic_obj
reflex:	Y-Z Y _{3,4} & Z	
Z	prep+case → REFL _{prep+case} other forms → ∅	
obligatoriness	Y, Z	

Figure 4. The basic rule *reflex_basic_obj* indicating changes in valency frames of verbs in the case of object-oriented reflexivity.

5. Syntactic Reciprocity

Reciprocal situations are those situations where one entity acts on another entity and, vice versa, the latter acts on the former as well. As with reflexive situations, reciprocal situations require at least binary predicates such that two of their valency complementations correspond to two distinct semantic participants.¹⁹ Unlike reflexivity (where the affected complementations refer to the same entity), the complementations affected by reciprocity refer to two distinct entities (either of which is singular or plural).²⁰ Further, reciprocity is characterized by complex mapping between semantic participants and valency complementations, as exemplified by the scheme in Figure 5 with the verb *nařknout*^{pf} ‘to accuse’.

In contrast to reflexivity, reciprocity can be usually expressed in individual languages by diverse means (see esp. Kemmer, 1993; Frajzyngier and Walker, 2000a; Nedjalkov, 2007; König and Gast, 2008; Evans et al., 2011), which gives evidence that reciprocity is less grammaticalized than reflexivity.

In Czech, reciprocity can be syntactically or lexically encoded. In the former case, syntax provides specific constructions conventionalized for expressing reciprocity (henceforth *syntactically reciprocal constructions*). In the latter case, a lexical unit of a verb contains the feature of reciprocity in its lexical meaning (henceforth *inherently re-*

¹⁹ In rare cases, three participants are involved in such a relation. In VALLEX, only two such lexical units of verbs are attested: *představovat*^{impf} – *představit*^{pf} and *seznamovat*^{impf} – *seznámit*^{pf} ‘to introduce’. Due to their sparsity, we leave these situations aside here.

²⁰ König and Gast (2008, p. 7) describe a reciprocal predicate as a binary predicate R acting on a set A and meeting the following formula:

$$\forall x, y \in A [x \neq y \rightarrow R(x, y)] \text{ and } |A| \geq 2 \text{ (strong reciprocity)}$$

Further, they broaden their delimitation of reciprocity to include also those predicates which meet the required condition for some pair of x and y (rather than for all pairs of arguments), namely “if x stands in relation R to y, then y also stands in relation R to x”.

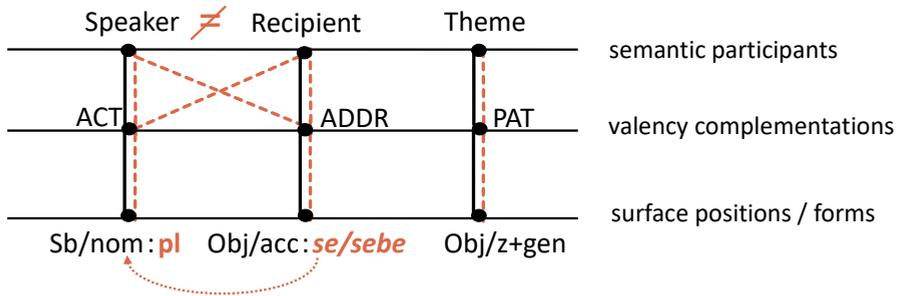


Figure 5. The mapping of semantic participants, valency complementations and surface positions in an example of syntactic reciprocity affecting *ACT* and *ADDR* of the verb *nařknout^{pf}* ‘to accuse’:

(Petr a Pavel).*ACT* se.*ADDR* vzájemně nařkli z podvodu.
 ‘Peter and Paul accused each other of deception.’

≈ Petr.*ACT* nařkl Pavla.*ADDR* z podvodu a Pavel.*ACT* nařkl Petra.*ADDR* z podvodu.
 ‘Peter accused Paul of deception and Paul accused Peter of deception.’

reciprocal verbs). As syntactically reciprocal constructions of inherently reciprocal verbs differ in the degree of their linguistic marking, we discuss them separately.²¹

Syntactically reciprocal constructions

In syntactically reciprocal constructions, one of the valency complementations involved in reciprocity is pluralized. This complementation is expressed either in the subject position (henceforth referred to as *subject-oriented reciprocity*), see examples (17-a) to (17-c), or in the direct object position (*object-oriented reciprocity*), see example (17-d). The other complementation affected by reciprocity – the one that is realized in a less prominent surface position – can be expressed by the reflexive personal pronoun or by the bipartite expression *jeden – druhý* ‘each other’, both marking the referential identity of this valency complementation and the one that is pluralized.²² As a result, the two valency complementations corefer.

²¹ However, let us remark that conventionalized reciprocal constructions expand to a broad range of situations, exceeding the one formally described in footnote 20. Namely, in the case where plural entities are involved in reciprocity, the relations between them can be configured in various ways. This issue has been largely discussed in formal semantics (see esp. Langendoen, 1978; Dalrymple et al., 1998). Different configurations of reciprocal relations are not, however, linguistically encoded, for Czech see esp. Panevová (2007) and for Slovak Ivanová (2020).

²² The bipartite expression *jeden – druhý*, which unambiguously marks reciprocity, is left aside here; see esp. Kettnerová and Lopatková (2020).

The reflexive pronoun, expressing the complementation in a less prominent surface position, can be either in the clitic or full form (compare examples (17-a) and (17-b)), depending on the morphological case and topic-focus articulation (see, e.g., Hajičová, 2007). However, in the case where this valency complementation has the comitative form, the less prominent surface position is mostly elided from the surface, see example (17-c).

- (17) a. *V zajetí se šimpanzice navzájem brání proti násilí ze strany samců ...*
 ‘In captivity, female chimpanzees defend each other against male violence ...’
- b. *[... omývači mrtvol se naučili okrádat nejen nebožtíky,] nýbrž i sebe navzájem ...*
 ‘[... corpse washers have learned to rob not only the dead] but also each other ...’
- c. *Také v těžkých dobách spolu cítíme.*
 ‘We also sympathize with each other in difficult times.’
- d. *Spojte plosky nohou a dejte ruce k sobě.*
 ‘Join the soles of the feet and put your hands together.’

The syntactic operation transforming an underlying non-reciprocal construction into a reciprocal one is called *syntactic reciprocalization*. As with syntactic reflexivization, syntactic reciprocalization is characterized by specific changes in the valency properties of verbs, namely changes in the morphosyntactic and lexical expression of their valency complementations (see Sections 5.1 and 5.2).

Syntactically reciprocal constructions with inherently reciprocal verbs

Besides conventionalized constructions, where the reciprocal situation is encoded by grammatical means, reciprocity can already be implied by the lexical meaning of some verbs, here called *inherently reciprocal verbs* (see esp. Panevová, 2007; Panevová and Mikulová, 2007). The term covers both verbs that are not derived by the word formation process of reflexivization and verbs that acquire the feature of reciprocity in this process.^{23,24} Inherently reciprocal verbs, containing the feature of reciprocity in their lexical meaning, express reciprocity for a particular pair (exceptionally two

²³ We thus distinguish between the reflexivization as a syntactic process producing syntactically reflexive constructions of a lexical unit of a verb (discussed in Section 4) and the reflexivization as a type of word formation process deriving a reflexive verb lemma from a non-reflexive one.

²⁴ Inherently reciprocal verbs that are not derived by the reflexivization of the latter type are referred to in the literature as symmetric predicates (König and Kokutani, 2006), lexical reciprocals (Nedjalkov, 2007) or allelic predicates (Haspelmath, 2007). Those that result from the word formation process of reflexivization and their verb lemmas are thus marked by the reflexives and are subsumed under the so-called verb-marked reciprocals (Haspelmath, 2007) or morphological grammatical reciprocals (Nedjalkov, 2007).

pairs) of their valency complementations already in their basic constructions, where these valency complementations are expressed in separate syntactic positions. However, the reciprocal meaning of these constructions is merely implicated by inherently reciprocal verbs, and their reciprocal interpretation can be easily canceled, compare example (18-a) with a reciprocal reading and (18-b) without this interpretation. The reciprocal interpretation of these constructions is thus strongly contextually dependent (see Rákosi, 2008 and for Czech Panevová, 2007).

- (18) a. *Gretchen právě hovořila s Richardem Sanfordem, ...*
 ‘Gretchen was just talking with Richard Sanford, ...’
 b. *Pachtinová s ním hovořila stísněně, jaksí bez jiskry, ...*
 ‘Pachtin was talking with him uneasily, somehow without a spark, ...’
 c. *Muži i ženy tam seděli u stolků nebo hovořili po skupinkách vstojе.*
 ‘Men and women sat there at tables or talked standing up in groups.’

In Czech, inherently reciprocal verbs allow for syntactically reciprocal constructions resulting from the operation of syntactic reciprocalization as well. In contrast to reciprocal constructions of verbs without the feature of reciprocity in their lexical meaning, syntactically reciprocal constructions of inherently reciprocal verbs require less linguistic marking, see example (18-c), where only the pluralized valency complementation in the subject encodes reciprocity. As a result, separate rules must be formulated for the syntactic operation of reciprocalization covering inherently reciprocal verbs (see Section 5.2).

5.1. Syntactic Reciprocity in the Data Component

In the data component of *VALLEX*, the attribute *recipr*, assigned to individual lexical units of verbs, provides the information on syntactic reciprocity in the form of pairs of the affected valency complementations (2,744 lexical units in total, represented by 2,909 verb lemmas). As in the case of reflexivity (Section 4.1), the information on reciprocity is restricted to actants, quasi-actants and obligatory free modifications.²⁵

Subject and object-oriented reciprocity are not explicitly distinguished here as this distinction follows from morphemic forms of the involved valency complementations. Similarly to reflexivity, subject-oriented reciprocity is much more frequent than object-oriented reciprocity, see Table 1 summarizing basic statistics on subject-oriented and object-oriented reciprocity contained in the *VALLEX* data.

²⁵ Optional free modifications can be involved in reciprocity as well (e.g., *Před ponořením si BEN navzájem kontrolovali vybavení.* ‘Before the dive, they checked each other’s equipment.’ with the pro-dropped actant *ACT* and the optional free modification *BEN* involved in reciprocity). However, as optional free modifications are not systematically covered in the *VALLEX* lexicon, we leave them aside although it can be supposed that reciprocity involving optional free modification follows similar principles as actants and quasi-actants.

As in the case of reflexivity, reciprocity can affect more than one pair of valency complementations with a single lexical unit of a verb (from 2,744 lexical units of verbs with the attribute *recipr*, 222 can have more than one pair of valency complementations involved in reciprocity). In such cases, different pairs of valency complementations are captured in separate attributes *recipr*, distinguished by an Arabic numeral, see example (19). Further, a lexical unit can bear the feature of reciprocity in its lexical meaning for one pair but need not do so for the other. The information on the nature of the lexical unit with respect to this feature, captured by the value inherent in the attribute *reciprverb*, is thus relevant for individual pairs of the affected valency complementations (not for the whole lexical unit; this attribute is therefore attached to the respective pairs of valency complementations, see example (19-b)).

- (19) *odpoutávat^{impf} – odpoutat^{pf}* ‘to detach’ ... **ACT**₁ **PAT**₄ **ORIG**_{od+2}
- a. *recipr1: ACT–ORIG*
... přece jsme od sebe.ORIG neodpoutali pohledy ...
 ‘... after all, we did not look away from each other ...’
 lit. ‘we did not detach from each other with our glances’
- b. *recipr2: PAT–ORIG, reciprverb2: inherent*
Během jednoho dne je třeba od sebe.ORIG odpoutat bojující strany.PAT.
 ‘Within one day, the warring parties must be detached from each other.’

type	¬inherent		inherent		total	
	pairs	LUs	pairs	LUs	pairs	LUs
subject	2,484	2,361	229	229	2,713	2,577
object	153	148	104	104	257	256
total	2,637	2,443	333	328	2,970	2,744

Table 1. Basic statistics on reciprocity (counted as pairs of the affected valency complementations and as the affected lexical units).

We can observe that, out of 222 lexical units with more than one pair of the valency complementations that can be involved in reciprocity, 27 lexical units represent inherently reciprocal verbs with respect to one pair of their valency complementations while they do not bear the feature of reciprocity for the other pair of complementations. Moreover, only five lexical units are characterized as inherently reciprocal verbs with respect to two distinct pairs of their complementations.

Subject-oriented reciprocity

In the case of subject-oriented reciprocity, the three pairs of valency complementations **ACT–PAT**, **ACT–ADDR** and **ACT–DIR3** are attested in the *VALLEX* data most frequently with verbs that do not bear the feature of reciprocity in their lexical meaning, see examples (20-a) to (20-c). With inherently reciprocal verbs, the pairs of the actants **ACT–PAT** and **ACT–ADDR** are contained in the data most often, see examples (21-a) and (21-b).²⁶

- (20) a. *bombardovat*^{impf} ‘to bomb’ ... **ACT**₁ **PAT**₄
 recipr: **ACT–PAT**
Obě válčící strany^{ACT} *se*^{PAT} *navzájem bombardovaly.*
 ‘Both warring parties bombed each other.’
- b. *vyhrožovat*^{impf} ‘to threaten’ ... **ACT**₁ **ADDR**₃ **PAT**_{7,že,cont}
 recipr: **ACT–ADDR**
 ..., *hráči*^{ACT} *si*^{ADDR} *vyhrožovali na střídačce i na ledě ...*
 ‘..., players threatened each other on the players’ bench and on the ice ...’
- c. *najíždět*^{impf} – *najet*^{pf} ‘to run at’ ... **ACT**₁ **DIR3**
 recipr: **ACT–DIR3**
Zpěnění koně^{ACT} *na sebe*^{DIR3} *najíždějí v divokých skocích.*
 ‘Frothy horses run at each other in wild jumps.’
- (21) a. *ladit*^{impf} ‘to fit’ ... **ACT**₁ **PAT**_{k+3,s+7}
 recipr: **ACT–PAT**, reciprverb: inherent
 ..., *aby (oděv a kabelka)*^{ACT} *spolu dokonale ladily.*
 ‘..., so that clothes and the handbag fit together perfectly.’
- b. *soutěžit*^{impf} ‘to compete’ ... **ACT**₁ **ADDR**_{proti+3,s+7} **PAT**_{o+4}
 recipr: **ACT–ADDR**, reciprverb: inherent
Přihlášení hráči^{PAT} *soutěžili ve dvojicích proti sobě*^{ADDR}.
 ‘The registered players competed in pairs against each other.’
Přihlášení hráči^{PAT} *soutěžili ve dvojicích.* (modified)
 ‘The registered players competed in pairs.’

²⁶ The following table gives numbers of pairs of the valency complementations affected by subject-oriented reciprocity, as attested in *VALLEX* – on the left are the pairs for which their governing lexical units do not bear the feature of reciprocity in their lexical meaning (with respect to the given pair, –inherent), on the right the pairs for which their governing lexical units contain this feature (inherent):

	–inherent		inherent				
ACT–PAT	1,583	ACT–DIR3	144	ACT–PAT	117	ACT–DIR3	2
ACT–ADDR	561	ACT–LOC	36	ACT–ADDR	108	ACT–DIR1	2
ACT–ORIG	80	ACT–DIR1	34				
ACT–EFF	24	ACT–DIR2	7				
ACT–OBST	15						

In syntactically reciprocal constructions, the pluralized valency complementation, typically **ACT**, is expressed as the (nominative) subject. The other valency complementation (i.e., the one that is realized in a less prominent surface position) is expressed depending on the lexical meaning of its governing lexical unit of the verb: (i) In the case of the lexical unit without the feature of reciprocity for the involved pair of complementations, the other valency complementation is expressed on the surface by the reflexive personal pronoun in the morphemic form determined for this complementation in the valency frame of the verb (the clitic or full form of the reflexive depends on the morphological case and on the topic-focus articulation, cf. Hajičová, 2007), see examples (20-a) to (20-c). In limited cases, the role of the reciprocal marker is taken over by adverbials expressing reciprocity.²⁷ (ii) If the lexical unit bears the feature of reciprocity of the affected valency complementations in its lexical meaning, the other valency complementation is only optionally expressed on the surface by the reflexive pronoun, compare examples in (21-b). In particular, when this complementation has the comitative form s+7, it is predominantly deleted from the surface, see example (21-a). Syntactically reciprocal constructions of inherently reciprocal verbs thus require less linguistic marking, see Section 5.2 below.

As to the surface position of the other valency complementation, it can be expressed as the direct object in the accusative, see example (20-a), as an indirect object, see examples (20-b) and the first example in (21-b), or as an adverbial, see example (20-c). The following morphemic forms are attested in the data for those actants and quasi-actants of lexical units that do not bear the feature of reciprocity in their lexical meaning: 2, 3, 4, 7, bez+2, do+2, k+3, kolem+2, mezi+4, na+4, na+6, nad+4, nad+7, o+4, o+6, od+2, po+6, podle+2, pro+4, proti+3, před+4, před+7, při+6, s+7, u+2, v+4, v+6, z+2, za+4, za+7 and the following ones for actants and quasi-actants of lexical units that bear the feature of reciprocity: 3, 7, k+3, od+2, proti+3, s+7, z+2.^{28,29}

²⁷ Adverbials as the primary marker of reciprocity occur in two cases. First, they can express reciprocity in syntactically reciprocal constructions of verbs with reflexive lemmas where the clitic reflexive is subject to haplology (compare, e.g., *A pak jsme si sobě postěžovali*, ... and *A pak jsme si navzájem postěžovali*, ... 'And then we complained to each other'). Second, the comitative, i.e., the form s+7 in Czech, differs in this respect as well: either the complementation in the comitative or an adverbial expressing reciprocity is present on the surface as the primary marker of reciprocity (compare, e.g., ..., *než by se sebou nesouhlasili*, ... '... rather than disagree with each other, ...' and *V mnoha věcech jsme spolu nesouhlasili*, ... 'We disagreed with each other on many things, ...')

²⁸ Morphemic forms of obligatory free modifications are not explicitly specified.

²⁹ As for the frequency of individual morphemic forms, prepositionless cases are attested with 1,571 LUs (1,012 accusatives, 526 datives, 52 genitives, and 25 instrumentals; note that more than one of these prepositionless cases can express a single affected valency complementation). Further, the listed prepositional cases occur with 960 LUs (the most frequent being s+7 (288 LUs), na+4 (223 LUs), and o+6 (116 LUs)).

Object-oriented reciprocity

In the case of object-oriented reciprocity, the three pairs of valency complementations illustrated in examples (22-a) to (22-c) are attested in the *VALLEX* data most frequently with verbs that do not bear the feature of reciprocity in their lexical meaning. Examples (23-a) to (23-c) then illustrate the pairs of valency complementations most frequently affected by reciprocity with verbs that bear the feature of reciprocity (with respect to these pairs).³⁰

- (22) a. *dávat* *impf* – *dát* *pf* ‘to put’ ... ACT₁ PAT₄ DIR₃
 recipr: PAT–DIR₃
Spojte plosky nohou a dejte ruce.PAT k sobě.DIR₃. (= (17-d))
 ‘Join the soles of the feet and put your hands together.’
- b. *přizpůsobovat* *impf* – *přizpůsobit* *pf* ‘to adjust’ ... ACT₁ PAT₄ EFF₃
 recipr: PAT–EFF
Je jasné, že musí být skutečně velmi složité přizpůsobit navzájem dva tak samostatné (učební a vyučující) nástroje.PAT, ...
 ‘It is clear that it must be really very difficult to adapt two so separate (learning and teaching) tools to each other, ...’
- c. *odstěhovat* *impf* ‘to move away’ ... ACT₁ PAT₄ DIR₁
 recipr: PAT–DIR₁
Někdy je nutné rozhádané klienty.PAT od sebe.DIR₁ odstěhovat.
 ‘Sometimes it is necessary to move quarrelsome clients apart.’
- (23) a. *sblížovat* *impf* – *sblížit* *pf* ‘to bring closer’ ... ACT₁ ADDR_{s+7} PAT₄
 recipr: ADDR–PAT, reciprverb: inherent
(Moskvu a Peking).PAT ale incident sblížil ...
 ‘The incident, however, brought Moscow and Beijing closer ...’
- b. *ztotožňovat* *impf* – *ztotožnit* *pf* ‘to identify’ ... ACT₁ PAT₄ EFF_{s+7}
 recipr: PAT–EFF, reciprverb: inherent
Není možné ztotožňovat (islám a terorismus).PAT.
 ‘It is not possible to identify Islam and terrorism.’
- c. *oddělovat* *impf* – *oddělit* *pf* ‘to separate’ ... ACT₁ PAT₄ ORIG_{od+2}
 recipr: PAT–ORIG, reciprverb: inherent

³⁰ The following table gives the number of pairs of the valency complementations affected by object-oriented reciprocity, as attested in *VALLEX* – the left part displays those pairs for which their governing lexical units do not bear reciprocity in their lexical meaning, the right part the ones for which they contain this feature:

–inherent		inherent					
PAT–EFF	20	PAT–DIR ₃	79	ADDR–PAT	53	PAT–DIR ₃	4
ADDR–PAT	8	PAT–DIR ₁	13	PAT–EFF	27	PAT–DIR ₁	4
PAT–ORIG	1	PAT–LOC	12	PAT–ORIG	15	PAT–LOC	1
PAT–OBST	9	PAT–DIR ₂	3				

[... počkal si] na vlnu, která na chvíli oddělila obě lodě.PAT od sebe.ORIG, ...
 ‘[... he waited] for the wave that separated the two ships from each other
 for a moment, ...’

In syntactically reciprocal constructions, the pluralized valency complementation is mostly expressed as the (accusative) direct object (22-a) to (22-c) and (23-a) to (23-c). Further, it can be sporadically realized as an indirect object in the dative (24-a), in the instrumental (the first example in (24-b)), or in the prepositional group s+7 (the second example in (24-b)). The other valency complementation, occupied by the reflexive personal pronoun, is realized on the surface depending on the lexical meaning of the verb and on the morphemic forms of this complementation. First, if the verb does not bear the feature of reciprocity in its lexical meaning, this valency complementation is realized as an indirect object³¹ in one of the following forms:³² 3, do+2, k+3, na+4, na+6, o+4, o+6, od+2, po+6, proti+3, s+7, před+7, v+4, see examples (24-a) and (24-b), or as an adverbial, see examples (22-a) and (22-c). Subjectless constructions are sporadically attested with object-oriented reciprocity as well, see example (24-a). Second, with inherently reciprocal verbs, this complementation mostly remains unexpressed (inherently reciprocal verbs thus require less linguistic marking, similarly to subject-oriented reciprocity). If it is realized on the surface, it is expressed as an indirect object with the following forms: 3, k+3, od+2 and proti+3, see example (23-c), or as an adverbial, see example (24-c).³³

- (24) a. *záležet*^{impf} ‘to care’ ... ACT₃ PAT_{na+6,aby}
 recipr: ACT–PAT
Toužím po pěkném vztahu dvou lidí, kterým.ACT na sobě.PAT opravdu záleží.
 ‘I long for a nice relationship between two people who really care about each other.’
- b. *mlátit*^{impf} ‘to beat’ ... ACT₁ PAT_{7,s+7} OBST_{o+4}
 recipr: PAT–OBST
 ..., *bral do rukou dva kameny a mlátil jimi.PAT o sebe.OBST, ...*

³¹ The only exception represents cases in which this valency complementation has the dative form. In this case, either the full form of the reflexive pronoun in the dative or one of the adverbials expressing reciprocity serves as the primary marker of reciprocity, see Table 3 in Section 5.2.

³² As in the case of reflexivity, this inventory of morphemic forms comprises only the forms of actants and quasi-actants.
 As for the frequency of individual morphemic forms, the dative is attested with 6 LUs and prepositional cases with 44 LUs.

³³ In the VALLEX data, the dative is attested with 4 LUs and the prepositional cases k+3, od+2, proti+3 with 33 LUs of inherently reciprocal verbs.
 In addition, in non-reciprocal constructions, the other valency complementation can be expressed by the morphemic forms 7, s+7 and za+4; however, the first two are obligatorily deleted from the surface in reciprocal constructions and the third one, s+7 (listed in 62 LUs), can only sporadically be expressed (see also Table 3, Section 5.2).

'..., he took two stones in his hands and smashed them against each other, ...'

[*Pořád si ode mě půjčuje ty medaile*] a dost s nimi.PAT o sebe.OBST mlátí.

'[He keeps borrowing those medals from me] and banging them against each other a lot.'

- c. *přibližovat*^{impf} – *přiblížit*^{pf} 'to bring closer' ... ACT₁ PAT₄ DIR₃

recipr: PAT–DIR₃, reciprverb: inherent

Sociální sítě přiblížily lidi.PAT k sobě.DIR₃ tak blízko, ...

'Social networks brought people so close,'

5.2. Syntactic Reciprocity in the Grammar Component

Syntactic reciprocity in the grammar component of VALLEX is described by two basic rules – one for subject-oriented syntactic reciprocity and the other for object-oriented reciprocity – applied to the valency frames of verbs underlying their non-reciprocal constructions. These basic rules describe changes concerning the valency complementation that is realized in the more prominent surface position involved in reciprocity. Both these basic rules are complemented by a set of supplementary rules, applied to the valency frames output by the basic rules. The supplementary rules determine changes related to the valency complementation expressed in the less prominent position.

Each rule consists of three sections (see Figures 6, 7 and Tables 2, 3):

A header identifies the rule.

Conditions indicate properties that a lexical unit of a verb and its valency frame must have so that the rule can be applied. Four properties are relevant here:

- First, the lexical unit must be characterized by the attribute *recipr* identifying a pair of the valency complementations affected by reciprocity; these complementations are represented by variables **X** and **Y** in the case of subject-oriented reciprocity (with **X** reserved for the nominative complementation), and by **Y** and **Z** in the case of object-oriented reciprocity.
- Second, in both types of rules, valency complementations are restricted by morphemic forms, introduced in their subscripts.
- Third, in the supplementary rules, it is specified whether these rules can be applied to verbs without the feature of reciprocity (*–reciprverb: inherent*), or to inherently reciprocal verbs (*reciprverb: inherent*).
- Fourth, in the supplementary rules for subject-oriented reciprocity only, conditions are imposed on verb lemmas, namely whether the rules are applicable to lexical units with reflexive lemmas (the abbreviation SE|SI), or to units with non-reflexive lemmas (*–SE|SI*).

A set of actions indicates changes in the valency frames of verbs underlying their non-reciprocal constructions necessary to generate the frames underlying their syntactically reciprocal constructions.

Three types of changes are relevant here:

- First, the valency complementation **X** in the case of subject-oriented reciprocity and **Y** in the case of object-oriented reciprocity is pluralized by the respective basic rules.³⁴
- Second, the supplementary rules stipulate that the valency complementation **Y** in the case of subject-oriented reciprocity and **Z** in the case of object-oriented reciprocity are filled by the reflexive personal pronoun in the respective morphemic form prescribed for this complementation; the abbreviation REFL, specified in the subscript by the index *prep+case*, is used for the form of the reflexives in prepositional groups, except for the comitative *s+7* (this form is treated by special rules). Alternatively, these valency complementations have the null form, i.e., they are not expressed on the surface (marked as \emptyset). Finally, other possible morphemic forms of all the valency complementations **X**, **Y** and **Z** involved in reciprocity, if available, are deleted.
- Third, the basic and supplementary rules determine that all the affected valency complementations (**X** and **Y** for subject-oriented reciprocity, or **Y** and **Z** for object-oriented reciprocity) must be obligatorily present in the deep structure of syntactically reciprocal constructions (the keyword “obligatoriness”).
- In addition, the supplementary rules indicate a list of adverbials emphasizing a reciprocal interpretation (the keyword “emphasis”).³⁵

If the valency complementation **Y** in the case of subject-oriented reciprocity and **Z** in the case of object-oriented reciprocity can be expressed by more than one prepositionless or prepositional case, all possible pairs of the respective basic rule and the respective supplementary rule are applied, generating more than one valency frame underlying reciprocal constructions.

Rules for subject-oriented reciprocity

The basic rule *rcpr_sbj_basic*, given in Fig. 6, describes changes concerning the valency complementation **X** in reciprocal constructions. Further, the supplementary rules defined for subject-oriented reciprocity are summarized in Table 2; the table presents the means of expressing reciprocity depending on the morphemic form of the valency complementation **Y**, on the lemma of its governing verb (whether it is reflexive or not; the symbol “—” stands for cases where this distinction is not relevant), and on the type of the verb (inherently reciprocal or not). The fourth column

³⁴ As **X**, reserved for the nominative complementation, functions as subject, the basic rule for subject-oriented reciprocity must cover also the change in verb agreement. For the sake of simplicity, we leave this issue aside.

³⁵ For the sake of simplicity, we omit this information from summarizing Tables 2 and 3.

of the table gives the forms of the reflexive personal pronoun and adverbials expressing reciprocity (\emptyset indicates that reciprocity, being expressed by the pluralized X , does not require additional marking). Fully formalized rules can be found in Lopatková et al. (2021).

The basic rule *rcpr_basic_subj* is applied to all cases of subject-oriented reciprocity recorded in the VALLEX data, namely it concerns 2,713 pairs of valency complementations in 2,577 lexical units. Table 2 then provides numbers of pairs of valency complementations and numbers of lexical units covered by the individual supplementary rules.

Subject-oriented reciprocity		rcpr_sbj_basic
recipr:	$X-Y$ $X_1 \& Y$	
X	* \rightarrow 1: plural	
obligatoriness	X	

Figure 6. The basic rule *rcpr_sbj_basic* indicating changes in valency frames of verbs in the case of subject-oriented reciprocity.

input form of Y	reflexive verb lemma	inherently reciprocal	expression of reciprocity	# pairs	# LUs
3	N	N	si, sobě	462	462
3	Y	N	sobě, navzájem, vzájemně, mezi sebou	57	57
3	Y	Y	sobě, \emptyset	7	7
4	—	N	se, sebe	1,012	1,012
2	—	N	sebe	52	52
7	—	N,Y	sebou	25	25
s+7	—	N	se sebou, navzájem, vzájemně, mezi sebou, spolu	75	75
s+7	—	Y	\emptyset , se sebou	213	213
prep+case	—	N	REFL _{prep+case}	860	665
prep+case	—	Y	REFL _{prep+case, \emptyset}	20	20

Table 2. The supplementary rules for subject-oriented reciprocity.

Let us illustrate how the valency frame underlying syntactically reciprocal constructions of the verb *rovnat se^{impf}* ‘to equal’ is derived. For the lexical unit of the verb

rovnat se *impf* ‘to equal’ with the valency frame in (25), it is determined in the data component of the lexicon that two of its actants, **ACT** and **PAT**, can be involved in reciprocity. As **ACT** is in the nominative, the basic rule for subject-oriented reciprocity *rcpr_sbj_basic* rule is applied. The rule identifies **ACT** as **X** and stipulates that this nominative **ACT** is pluralized and must be present in the deep structure of syntactically reciprocal constructions (but can be deleted from the surface); see Fig. 6. Subsequently, the supplementary rule covering the dative **Y** for inherently reciprocal verbs with reflexive lemmas is applied, selected on the basis of the following three properties of the lexical unit (see Table 2). First, **PAT** is in the dative. Second, reciprocity of **ACT** and **PAT** is marked by the attribute *recipverb* with the value *inherent* as encoded in the lexical meaning of the lexical unit. Third, the verb lemma representing this lexical unit contains the reflexive verbal affix *se*. This supplementary rule then states that **PAT** must be present in the deep structure of reciprocal constructions and is occupied by the full form of the reflexive personal pronoun *sobě* or has the null form, thus remaining unexpressed on the surface, see the resulting valency frame (26), underlying the reciprocal constructions in (26-a) and in (26-b).³⁶

- (25) *rovnat se* *impf* ‘to equal’ ... **ACT**₁ **PAT**₃
 recipr: **ACT**–**PAT**, *recipverb*: inherent
 ... *rozměr^{ACT} strany základny jehlanu se rovná průměru^{PAT} základny kužele.*
 ‘... the length of the side of the base of the pyramid is equal to the diameter of the base of the cone.’
- (26) **ACT**_{1:plural} **PAT**_{sobě,∅}
- ... *zda se sobě^{PAT} strany^{ACT} rovnice rovnají.*
 ‘... whether the sides of the equation are equal to each other.’
 - V praxi se však tyto podíly^{ACT} nerovnají.*
 ‘In practice, however, these proportions are not equal to each other.’

Rules for object-oriented reciprocity

The basic rule *rcpr_obj_basic*, given in Fig. 7, characterizes changes of the valency complementation **Y** in the case of object-oriented reciprocity. The basic rule is complemented by six supplementary rules summarized in Table 3. The supplementary rules present the means of expressing reciprocity depending on the morphemic form of the valency complementation **Z** (column headed with **Z**), and on the type of its governing verb (inherently reciprocal or not). The third column gives the forms of the reflexive personal pronoun and adverbials expressing reciprocity (\emptyset indicates

³⁶ In the case of the null form of **PAT**, the rule copes with the fact that the clitic form of the reflexive pronoun in the dative *si* (in contrast to its full form *sobě*) is subject to haplogy, i.e., it fuses with the reflexive verbal affix *se* as part of the verb lemma (see Rosen, 2014). As a result, the resulting reciprocal construction contains only a single reflexive *se*, see example (26-b).

that reciprocity is expressed by the pluralized **Y** only and does not require further marking). Fully formalized rules can be found in Lopatková et al. (2021).

Reciprocity Y-Z		rcpr_obj_basic
recipr:	Y-Z Y _{3,4,7s+7}	
Y	3 → 3: plural 4 → 4: plural 7 → 7: plural s+7 → s+7: plural	
obligatoriness	Y	

Figure 7. The basic rule *rcpr_obj_basic* indicating changes in valency frames of verbs in the case of object-oriented reciprocity.

The basic rule *rcpr_basic_obj* is applied to all cases of object-oriented reciprocity recorded in the *VALLEX* data, namely it concerns 257 pairs of valency complementations in 256 lexical units. Table 3 then provides numbers of pairs of valency complementations and numbers of lexical units covered by the individual supplementary rules.

Let us illustrate the rule for object-oriented reciprocity with one of the lexical units of the verb *vystřídát*^{pf}. This lexical unit is characterized by the reciprocity of **PAT** and **EFF**, see the valency frame of this unit (27), underlying its non-reciprocal constructions. To generate the valency frame describing its reciprocal constructions, the basic rule for object-oriented reciprocity, the rule *rcpr_obj_basic*, is used (see Fig. 7). This rule identifies **PAT** as **Y**, changes its number into plural and stipulates that it is obligatorily present in both deep and surface structure of reciprocal constructions. Further, this basic rule is supplemented with the rule determined for **Z** in the instrumental with inherently reciprocal verbs, as given in Table 3. According to this rule, **EFF** in the instrumental has the null form, i.e., it remains unexpressed on the surface, see the resulting valency frame in (28) and the example of a reciprocal construction given there.

- (27) *vystřídát*^{pf} ‘to change’ ... **ACT**₁ **PAT**₄ **EFF**_{7,s+7,za+4}
 recipr: **PAT-EFF**, reciprverb: inherent
 ..., když [trenér Brückner] vystřídál záložníka Šmicera.**PAT** obráncem.**EFF** Jiránkem, ...
 ‘...when [coach Brückner] replaced midfielder Šmicer with defender Jiránek,
 ...’

input form of Z	inherently reciprocal	expression of reciprocity	# pairs	# LUs
3	Y	∅, sobě	4	4
3	N	sobě or one of the adverbials <i>navzájem, vzájemně</i>	6	6
7	Y	∅	3	3
s+7	N,Y	∅, se sebou	63	63
prep+case	Y	REFL _{prep+case} and/or ⁺⁺ ∅	43	43
prep+case	N	REFL _{prep+case}	46	46

⁺⁺ The full rule specifies the choice of a morphemic form (REFL_{prep+case} or the null form) depending on the input prepositional case (see Lopatková et al., 2021 and footnote 33).

Table 3. The supplementary rules for object-oriented reciprocity.

- (28) ACT₁ PAT_{4:plural} EFF_∅
Vystřídala jsem už tři různé zaměstnavatele.PAT.
 ‘I have already changed three different employers.’

As the actant EFF has the form of the prepositional groups s+7 and za+4 as well, the supplementary rules for these forms are applied to the output of the basic rule, too: the supplementary rule for the form za+4 gives the same output valency frame as the rule for the instrumental case already shown in (28) while the supplementary rule for the form s+7 allows (in addition to the null form) the reflexive personal pronoun *se sebou* to be expressed on the surface (however, this form is very rare).³⁷

6. Reflexive-reciprocal Ambiguity

As the reflexive personal pronoun in Czech encodes both reflexivity and reciprocity, syntactic constructions marked by the reflexives can – under certain conditions – be ambiguous, i.e., they can have either a reflexive or a reciprocal reading. Ambiguous constructions are formed by lexical units of verbs for which the same pair of valency complementations can be involved in both reflexivity and reciprocity. Then if the valency complementation expressed in the more prominent syntactic position is plural and at the same time the one in the less prominent position is expressed by the reflexive personal pronoun, the resulting construction is either reflexive or reciprocal, depending on the context.

For example, with the lexical unit of the verb *odpouštět^{impf} – odpustit^{pf}*, ACT and ADDR can be affected by both reflexivity and reciprocity, see the valency frame and the reflex and recipr attributes in (29). If ACT is plural and ADDR is expressed by the reflexive pronoun, the resulting construction has two interpretations: it is either re-

³⁷ See also footnote 33.

flexive or reciprocal, see example (29-a). To disambiguate its meaning, the following expressions are used: the pronoun *sám* ‘oneself’ for the reflexive reading and the adverbials *vzájemně*, *navzájem*, *spolu* or *mezi sebou* for the reciprocal reading, compare examples (29-b) and (29-c).

- (29) *odpouštět^{impf} – odpustit^{pf}* ‘to forgive’ ... ACT₁ ADDR₃ PAT_{4,že}
 reflex: ACT–ADDR
 recipr: ACT–ADDR
- a. *Odpustme si_{ADDR} naše viny ...*
 ‘Let us forgive ourselves our guilt ...’ or
 ‘Let us forgive each other our guilt ...’
- b. *Odpustme sami sobě_{ADDR}, ... (modified)*
 ‘Let us forgive ourselves, ...’
- c. *Odpustme si_{ADDR} navzájem ... (modified)*
 ‘Let us forgive each other ...’

In the VALLEX data, 1,768 lexical units of verbs make it possible to create both reflexive and reciprocal constructions. Out of these, 1,653 lexical units are characterized by reflexivity and reciprocity affecting the same pair of valency complementations (1,738 pairs in total).³⁸ These lexical units thus form ambiguous constructions with either a reflexive or a reciprocal interpretation. The rules contained in the grammar component of the lexicon then determine the linguistic means disambiguating their reading (see Lopatková et al., 2021).

7. Conclusion

This paper has provided a thorough description of the lexicographic representation of two valency changing phenomena, reflexivity and reciprocity, in VALLEX, the valency lexicon of Czech verbs. This representation makes use of two components of the lexicon: the data and the grammar component.

In the data component, around one third of the lexical units of verbs are assigned the attributes *reflex* and/or *recipr*, providing the information on pairs of valency complementations that can be involved in reflexivity and/or reciprocity (namely, 2,039 lexical units with *reflex* and 2,744 with *recipr* out of 6,829 lexical units in total). Each lexical unit can be assigned more than one attribute *reflex* and more than one attribute *recipr*, reflecting the fact that lexical units allow different pairs of their valency complementations to be affected by these phenomena. If a lexical unit bears the feature

³⁸ The following pairs of valency complementations can be affected by both reflexivity and reciprocity:

ACT–PAT	1,208 LUs	PAT–EFF	6 LUs	ACT–DIR3	36 LUs	PAT–DIR3	2 LUs
ACT–ADDR	425 LUs	ADDR–PAT	1 LU	ACT–LOC	8 LUs		
ACT–ORIG	27 LUs			ACT–DIR1	6 LUs		
ACT–EFF	19 LUs						

of reciprocity for some of its valency complementations in its lexical meaning, the attribute *recipr* is coupled with the attribute *reciprverb* with the value *inherent*, indicating that the lexical unit behaves with respect to this pair of valency complementations as an inherently reciprocal verb (328 lexical units).

The grammar component then stores rules that allow the valency frames underlying reflexive and reciprocal constructions of these lexical units of verbs to be derived from the valency frames describing their non-reflexive and non-reciprocal constructions (in the case of inherently reciprocal verbs, they reflect that these verbs require less linguistic marking).

As Czech uses reflexives for expressing both reflexivity and reciprocity, some lexical units can create ambiguous constructions that have either a reflexive or a reciprocal reading. These lexical units (1,653 in total) have the same pairs of valency complementations recorded in the attributes *reflex* and *recipr*. The rules then provide a list of the linguistic means disambiguating between a reflexive and a reciprocal interpretation.

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