

**Valency Information in VALLEX 2.0****Logical Structure of the Lexicon**

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Abstract

The Valency Lexicon of Czech Verbs (VALLEX 2.0) is a collection of linguistically annotated data and documentation. It provides information on the valency structure of verbs in their particular meanings / senses, possible morphological forms of their complementations and additional syntactic information, accompanied with glosses and examples. The primary goal of the following text is to briefly describe the content of VALLEX 2.0 data from a structural point of view.

1. Introduction

The Valency Lexicon of Czech Verbs, Version 2.0 (VALLEX 2.0) is a collection of linguistically annotated data and documentation, resulting from an attempt at a formal description of the valency frames of Czech verbs. VALLEX has been developed at the Institute of Formal and Applied Linguistics (ÚFAL) at Faculty of Mathematics and Physics, Charles University in Prague. VALLEX 2.0 is a successor of VALLEX 1.0, see [Lopatková et al. \(2003\)](#), extended in both theoretical and quantitative aspects.

1.1. Basic characteristics

VALLEX 2.0 provides information on the valency structure of verbs in their particular meanings / senses, possible morphological forms of their complementations and additional syntactic information, accompanied with glosses and examples. All lexeme entries in VALLEX are created manually; manual annotation with accent on consistency is highly time consuming and limits the speed of quantitative growth, but allows for reaching the desired quality.

VALLEX is closely related to the Prague Dependency Treebank (PDT) project, see e.g. [Hajič \(2005\)](#). The Functional Generative Description (FGD), being developed by Petr Sgall and his

collaborators since the 1960s, see esp. Sgall, Hajičová, and Panevová (1986); Hajičová, Partee, and Sgall (1998); Panevová (1974); Panevová (1994), is used as the background theory both in PDT and in VALLEX. In PDT, FGD is being verified by a complex annotation of large amounts of textual data, whereas in VALLEX it is used only for the description of the valency frames of selected verbs.

In VALLEX 2.0, there are roughly 2,730 lexeme entries containing together around 6,460 lexical units ('senses'). It is important to mention that VALLEX 2.0 – according to FGD and unlike traditional dictionaries – treats a pair of perfective and imperfective aspectual counterparts as a single lexeme. Therefore, if perfective and imperfective verbs are counted separately, the size of VALLEX 2.0 virtually grows to 4,250 entries (still without counting iteratives).

The verbs contained in VALLEX 2.0 were selected as follows: (1) We gradually processed around 2500 most frequent Czech verbs, according to the number of their occurrences in a part of the Czech National Corpus.¹ (2) Simultaneously, we added their perfective or imperfective aspectual counterparts (if they were not already present in the list of the most frequent verbs), and occasionally also iterative counterparts.

VALLEX 2.0 is issued in an electronic form available at <http://ufal.mff.cuni.cz/vallex/2.0>. From the very beginning, it has been designed with emphasis on both human and machine readability. Therefore, both linguists and developers of applications within the Natural Language Processing domain can use and critically evaluate its content (of course, any feedback from them will be a valuable source of information for us, as well as a great motivation for further work). In order to satisfy different needs of these different potential users, VALLEX 2.0 contains the data in the following three formats:

- **Browsable version.** The HTML version of the data allows for an easy and fast navigation through the lexicon. Lexemes and lexical units are organized in several ways, following various criteria. The screenshot of a particular lexeme is given in Figure 2 in Appendix.
- **Printable version.** The graphical layout of the lexeme entries in the printed version of the lexicon is illustrated in Figure 3 in Appendix.
- **XML version.** Programmers can run sophisticated queries (e.g. based on the XPATH query language) on this machine-tractable data, or use it in their applications.

1.2. Structure of the article

The primary goal of the following text is to briefly describe the content of VALLEX 2.0 data from a structural point of view. Linguistic issues requiring an extensive explanation or discussion are mostly left apart. However, more detailed description (and also additional relevant references) can be found in Žabokrtský (2005). Some theoretical issues concerning valency are summarized in Lopatková (2003).

The description of the VALLEX 2.0 structure is slightly simplified here, in order to correspond straightforwardly to the visual form of the lexicon and to be sufficient for its full understanding. It neglects certain features present in the underlying XML version of the lexicon,

¹<http://ucnk.ff.cuni.cz>

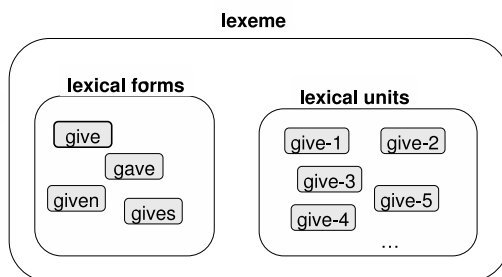


Figure 1. Illustration of the notions of lexeme, lexical form, and lexical unit.

from which both the printed and html version have been generated. Again, the details about the (slightly richer) XML structure are available in [Žabokrtský \(2005\)](#).

This paper is organized as follows: In Section 2, we introduce lexemes, abstract entities that constitute the lexicon on the topmost level. Section 3 deals with lexical forms and lemmas – reflexive verb forms, aspectual counterparts, lemma variants, and homographs are mentioned there. Lexical forms are associated with lexical units briefly described in Section 4. The core valency information is encoded in the valency frame; in Section 5, functors (labels for ‘deep roles’), possible morphemic realizations and obligatoriness of particular valency complementations are discussed. Section 6 refers to optional attributes of a lexical unit, namely control, reflexivity, reciprocity, semantic class, and flag for idiomatic usage.

As for terminology, the terms used here either belong to the broadly accepted linguistic terminology, or come from FGD (which we have used as the background theory), or are defined somewhere else in this text.

2. Lexemes

On the highest level, VALLEX 2.0 is composed of **lexemes**. Lexeme is understood as a two-fold abstract entity: it associates a set of possible **lexical forms** (by which the presence of the lexeme is manifested in an utterance, Section 3) with a set of **lexical units** (complexes of syntactic and semantic features, LUs for short, Section 4). In simpler words, lexical forms can be viewed as the conjugated forms of a given verbal lexeme, whereas each LU corresponds roughly to the lexeme used in a specific sense and with specific syntactic combinatorial potential. This view is illustrated in Figure 1.

3. Lexical forms and lemmas

It is usual in dictionaries that the set of all possible lexical forms of a given lexeme is represented only by the infinitive form called lemma.

Lemma in VALLEX 2.0 should be considered as a complex structure:

- it always contains the ‘base’ infinitive form;
- it is always labeled in superscript with its morphological aspect (Section 3.2);
- it may contain also reflexive particle (e.g. *bát se* – to fear, see Section 3.1);
- it may be also labeled with a Roman number in subscript if it is necessary to distinguish it from its homograph (e.g. *nakupovat_I* – to buy vs. *nakupovat_{II}* – to heap, see Section 3.4).

In VALLEX 2.0, there are typically two or more lemmas listed at the beginning of the lexeme entry. It follows the FGD principle of treating aspectual counterparts (perfective and imperfective verbs expressing the same lexical meaning, Section 3.2) as manifestations of the same lexeme. Another reason for more lemmas being present in the same lexeme might be the existence of orthographic variants (Section 3.3).

3.1. Reflexive lemmas

In VALLEX 2.0, two types of reflexive constructions are distinguished:

- Reflexive lexemes – both ‘reflexiva tantum’ (e.g. *bát se* – to fear, *smát se* – to laugh) and derived reflexives (e.g. *odpovídat se* – to account, *šířit se* – to spread, *vrátit se* – to return) are represented as separate lexemes, and the reflexive particles *se* or *si* are considered as parts of their lemmas.
- Reflexive usage of irreflexive lexemes – if the reflexive particles/pronouns *se* or *si* have specific syntactic function(s), reflexive forms of particular verbs are treated within irreflexive lexemes and their possible functions are specified (see Sections 6.2 and 6.3) – *se* or *si* can be a part of the reflexive passive form (e.g. in *pátrá se po zloději* – a thief is being looked for); it can be a complementation fulfilling some valency slot of the governing verb (e.g. *mýt se* – to wash oneself, where *se* is PAT (Patient) coreferential with ACT (actor)), or it can mark reciprocity (e.g. *kopat se* in *kopou se vzájemně do nohou* – they kick each other’s legs).

3.2. Aspectual counterparts

Imperfective and perfective verb forms are distinguished in Czech (as well as a specific subclasses of iterative verbs and so called biaspectual verbs); this characteristic is called aspect. In VALLEX 2.0, the value of aspect is attached to each lemma as a superscript label:

- *impf* for imperfective;
- *pf* for perfective;
- *iter* for iterative verbs;
- *biasp* for biaspectual verbs.

There are three ways how aspectual counterparts (verbs with the same or very similar lexical meaning differing in aspect) are formed in Czech (sorted according to productivity):

- *affixation*: an imperfective verb is derived from the perfective one, e.g. by infix *-ova-*, *vypsát* → *vypisovat* – to excerpt, to write off;

- *prefixation*: a perfective verb is derived from the imperfective one by adding a prefix, e.g. *psát* → *napsat* – to write;
- suppletive (phonemically unrelated) couples: *vzít* / *brát* – to take.

Aspectual counterparts of the first and third type constitute a single lexeme in VALLEX 2.0, as e.g. in the case of *nasedat^{impf}*, *nasednout^{pf}*, *nasedávat^{iter}* – to get on.

As already mentioned, a LU typically shares all its lemmas with the other LUs in the lexeme in which it is embedded. However, there are exceptions: the aspectual counterpart(s) need not be the same for all LUs of the particular lexeme. For example, *odpověď^{pf}* is a counterpart of *odpovídat^{impf}* in the sense ‘to answer’, but not in the sense ‘to correspond’. In such cases, the set of applicable lemmas is specified directly for the LU (and overrides the set of lemmas specified for the whole lexeme).

There might be more than one lemma with the same aspect in a lexeme (without being lemma variants, see Section 3.3). Then the aspect flags are distinguished by Arabic numbers, as e.g. in the lexeme *osušovat^{impf1}*, *osušet^{impf2}*, *osušit^{pf}* – to dry up, to wipe, or *odřezávat^{impf}*, *odříznout^{pf1}*, *odřezat^{pf2}* – to cut off (unique aspect flags are necessary because they serve also for co-indexing the lemmas with example sentences illustrating the usage of the lexeme).

Some verbs (e.g. *informovat* – to inform, *charakterizovat* – to characterize) can be used in different contexts either as imperfective or as perfective. They are called biaspectual verbs.

Within imperfective verbs, there is a subclass of iterative verbs (*iter.*). Czech iterative verbs are derived more or less in a regular way by affixes such as *-va-* or *-íva-*, and express extended and repetitive actions (e.g. *číst* – to read → *čítávat*, *chodit* – to walk → *chodívat*). In VALLEX 2.0, iterative verbs containing double affix *-va-* (e.g. *chodívat*) are completely disregarded, whereas the remaining iterative verbs occur as headword lemmas of the relevant lexeme.

3.3. Lemma variants

Lemma variants (many of which are just spelling variants, i.e. orthographic variants) are groups of two or more lemmas that are interchangeable in any context without any change of the meaning (e.g. *dovědět se/dozvědět se* – to learn). Usually, the only difference is just a small alternation in the morphological stem, which might be accompanied by a subtle stylistic shift (e.g. *myslet/myslit* – to think, the latter one being bookish). Moreover, although the infinitive forms of the variants differ in spelling, some of their conjugated forms might be identical (*mysli* (imper.sg.) both for *myslet* and *myslit*).

There are rare exceptions when only one of the variants can be used, e.g. *plavat* and *plovat* – to swim, are usually considered to be variants, see, e.g. [SSJČ \(1964\)](#), although, in some contexts, only *plavat*, in the sense ‘to flounder’, can be used (*plavat při zkoušce*, **plovat při zkoušce*). The applicable lemmas must be then listed for the specific LU as in any other cases when a LU imposes a further limitation on the set of lexical forms.

3.4. Homographs

Homographs are lemmas ‘accidentally’ identical in the spelling but considerably different in their meaning (there is no obvious semantic relation between them). They also might differ as to their etymology (e.g. *nakupovat_I* – to buy vs. *nakupovat_{II}* – to heap), aspect (Section 3.2) (e.g. *stačit_I* pf. – to be enough vs. *stačit_{II}* impf. – to catch up with), or conjugated forms (*žilo* (past.sg.fem) for *žít_I* – to live vs. *žalo* (past.sg.fem) *žít_{II}* – to mow. In VALLEX 2.0, such lemmas are distinguished by Roman numbering in the subscript. These numbers should be understood as inseparable parts of VALLEX 2.0 lemmas.

4. Lexical units

Each lexeme is formed by a set of lexical units that are assigned to respective lexical forms (represented by their lemmas). Following Cruse (1986), we understand lexical units (LUs) as “form-meaning complexes with (relatively) stable and discrete semantic properties”. Roughly speaking, LU can be understood as ‘a given word in the given sense’. In the Czech tradition, this concept of LU corresponds to Filipec’s ‘monosemic lexeme’, see Filipec and Čermák (1985).

Within each lexeme in VALLEX 2.0, LUs are numbered by Arabic numbers. In the printed and html versions of the lexicon, the LU entry starts with its number.

The ordering of lexical units is not completely random, but it is not perfectly systematic either. So far, it is based only on the following weak intuition: the primary and/or the most frequent meanings should go first, whereas rare and/or idiomatic meanings should go last. (We do not guarantee that the ordering of LUs in VALLEX 2.0 exactly matches their frequency in the contemporary language.)

By default, a LU ‘inherits’ all lemmas specified for the given lexeme in which it is embedded. However, it might happen that for a given LU not all the forms specified for the whole lexeme are applicable. In such cases, the list of applicable lemmas is specified for the given LU separately.

Available information about each LU entry in VALLEX 2.0 is captured by obligatory and optional attributes. The former ones have to be filled with every LU. The latter ones might be empty, either because they are not applicable (e.g. no control can be applicable for verbs without infinitive complementations), or because the annotation was not finished yet (e.g. attribute class, Section 6.4).

Obligatory LU attributes:

- valency frame (Section 5);
- gloss – verb or paraphrase roughly synonymous with the given sense/meaning; this attribute is not supposed to serve as a source of synonyms or even of genuine lexicographic definition – it should be used just as a clue for fast orientation within the word entry!
- example – sentence(s) or sentence fragment(s) containing the given verb used with the given valency frame.

Optional LU attributes:

- flag for idiom (Section 6.5);
- information on control (Section 6.1);

- possible type(s) of reflexive constructions (Section 6.2);
- possible type(s) of reciprocal constructions (Section 6.3);
- affiliation to a syntactico-semantic class (Section 6.4).

In the printable version (see Figure 3 in Appendix), the gloss is located in parentheses at the beginning of every LU entry, and then the valency frame is printed. Example sentence follows the diamond sign, and the optional attributes (if any) are given after the cross sign. If more lemmas are relevant for the given lexeme (as it is often the case because of aspectual pairs), it might be necessary to give more values also in the attribute (especially in the example attribute). The correspondence between the respective values and the relevant lemmas is captured by superscript labels *pf*, *impf*, *pf¹* etc.

5. Valency frames

The core valency information is encoded in the **valency frame**. Within the FGD framework, valency frames (in a narrow sense) consist only of inner participants (both obligatory and optional) and obligatory free modifications, see Panevová (1974); Panevová (1994). In VALLEX 2.0, valency frames are enriched with quasi-valency complementations. Moreover, a few non-obligatory free modifications occur in valency frames too, since they are typically related to some verbs (or even to whole classes of them) and not to others.²

In VALLEX 2.0, a valency frame is modeled as a sequence of frame slots. Each frame slot corresponds to one (either required or specifically permitted) complementation of the given verb.

Note on terminology: in this text, the term ‘complementation’ (dependent item) is used in its broad sense, not related to the traditional argument/adjunct (complement/modifier) dichotomy.

The following attributes are assigned to each slot:

- functor (Section 5.1);
- list of possible morphemic forms (realizations) (Section 5.2);
- type of complementation (Section 5.3).

Some slots tend to occur systematically together. In order to capture this type of regularity, we have introduced the mechanism of slot expansion, Section 5.4 (full valency frame is obtained after performing these expansions).

5.1. Functors

In VALLEX 2.0, functors (labels for ‘deep roles’; similar to theta-roles) are used for expressing types of relations between verbs and their complementations. According to FGD, functors are divided into inner participants (actants) and free modifications (this division roughly corresponds to the argument/adjunct dichotomy), see Panevová (1974); Panevová (1994). In

²The other free modifications can occur with the given verb too, but they are not contained in the valency frame as their presence in a sentence is not understood as syntactically conditioned in FGD.

VALLEX 2.0, we also distinguish an additional group of quasi-valency complementations, see esp. [Lopatková and Panevová \(2005\)](#).

Funcutors that occur in VALLEX 2.0 are listed in the following tables (for Czech sample sentences see [Lopatková et al., 2002](#), page 43):

Inner participants:

- ACT (actor): *Peter* read a letter.
- ADDR (addressee): Peter gave *Mary* a book.
- PAT (patient): I saw *him*.
- EFF (effect): We made her the *secretary*.
- ORIG (origin): She made a cake *from apples*.

Quasi-valency complementations:

- DIFF (difference): The value of shares has risen *by 100%*.
- OBST (obstacle): The boy stumbled *over a stump*.
- INTT (intent): He came there *to look for Jane*.

Free modifications:

- ACMP (accompaniment): Mother came *with her children*.
- AIM (aim): John came to a bakery *for a piece of bread*.
- BEN (benefactive): She made this *for her children*.
- CAUS (cause): She did so *since they wanted it*.
- COMPL (complement): They painted the wall *blue*.
- CRIT (criterion): Peter has to do it exactly *according to directions*.
- DIR1 (direction-from): He went *from the forest to the village*.
- DIR2 (direction-through): He went *through the forest to the village*.
- DIR3 (direction-to): He went *from the forest to the village*.
- DPHR (dependent part of a phraseme): Peter talked *horse again*.
- EXT (extent): The temperatures reached *an all time high*.
- HER (heritage): He named the new villa *after his wife*.
- LOC (locative): He was born *in Italy*.
- MANN (manner): They did it *quickly*.
- MEANS (means): He wrote it *by hand*.
- RCMP (recompense): She bought a new shirt *for 25 \$*.
- REG (regard): *With regard to George* she asked his teacher for advice.
- SUBS (substitution): He went to the theater *instead of his ill sister*.
- TFHL (temporal-for-how-long): They interrupted their studies *for a year*.
- TFRWH (temporal-from-when): His bad reminiscences came *from this period*.

- THL (temporal-how-long): *We were there for three weeks.*
- TOWH (temporal-to when): *He put it over to next Tuesday.*
- TSIN (temporal-since-when): *I have not heard about him since that time.*
- TTIL (temporal-till-when): *It will last till 5 o'clock.*
- TWHEN (temporal-when): *He will come tomorrow.*

Note 1: Besides the functors listed in the tables above, also value DIR occurs in the VALLEX 2.0 data. It is used only as a special symbol for the slot expansion (Section 5.4).

Note 2: The set of functors as introduced in FGD and used in the Prague Dependency Treebank is richer than that shown above, see Mikulová et al. (2006). We do not use its full (current) set in VALLEX 2.0 due to several reasons. Some functors do not occur with verbs at all (e.g. MAT – material, partitive, as *sklenice piva*.MAT – glass of beer), some other functors can occur there but represent other than dependency relations (e.g. coordination, *Jim nebo*.CONJ Jack – Jim or Jack). And still others can occur with verbs as well but their behavior is absolutely independent of the head verb; thus they have nothing to do with valency frames (e.g. ATT – attitude, *udělal to dobrovolně*.ATT – he did it willingly).

5.2. Morphemic forms

In a sentence, each frame slot can be expressed by a limited set of morphemic means which we call forms. In VALLEX 2.0, the set of possible forms (supposing active verb form) is defined either explicitly, or implicitly.

In the first case (explicitly declared forms), the forms are enumerated in a list attached to the given slot (in the case of arguments and quasi-valency complementations, no other forms can be used; in the case of free modifiers, the possible forms are not necessarily limited to those given in the list).

In the second case (implicitly declared forms), no such list is specified because the set of possible forms is implied by the functor of the respective slot (in other words, all forms possibly expressing the given functor may appear).

5.2.1. Explicitly declared forms

The list of forms attached to a frame slot may contain values of the following types:

- **Pure (prepositionless) case.** There are seven morphological cases in Czech. In the VALLEX 2.0 notation, we use numbering traditional in the Czech linguistics: 1 – nominative, 2 – genitive, 3 – dative, 4 – accusative, 5 – vocative, 6 – locative, and 7 – instrumental.
- **Prepositional case.** Lemma of the preposition (i.e. preposition without vocalization) and the number of the required morphological case are specified (e.g. *z+2, na+4, o+6, ...*). The prepositions occurring in VALLEX 2.0 are the following: *bez, do, jako*³, *k, kolem*,

³Word *jako* is traditionally considered as a conjunction, but it is included in this list as it requires a particular morphological case in some valency frames

mezi, místo, na, nad, o, od, po, pod, podle, pro, proti, před, přes, při, s, u, v, z, za.

- **Infinitive construction.** The abbreviation ‘inf’ stands for infinitive verbal complementation; ‘inf’ can appear together with a conjunction (e.g. *než+inf*), but it happens very rarely in Czech.
- **Subordinated clauses.** Subordinated content clauses introduced by subordinating conjunctions are represented by the conjunction lemmas; the following values occur in VALLEX 2.0: *aby, ať, až, jak, zda*,⁴ *že*.
Subordinated content clauses not introduced by a conjunction (e.g. those having the form of an indirect speech with an interrogative pronoun or pronominal adverb) are represented by the abbreviation ‘cont’.
- **Construction with adjectives.** Abbreviation ‘adj-digit’ stands for an adjective complementation in the given case, e.g. adj-1 (e.g. *cítím se slabý* – I feel weak).
- **Constructions with *být*.** Infinitive of verb *být* (to be) may combine with some of the types above, e.g. *být+adj-1* (e.g. *zdá se to být dostatečné* – it seems to be sufficient).
- **Part of phraseme.** If the set of the possible lexical values of the given complementation is very small (often one-element), we list these values directly (e.g. *napospas* for the phraseme *ponechat napospas* – to expose).

5.2.2. Implicitly declared forms

If no forms are listed explicitly for a frame slot, then the list of possible forms implicitly results from the functor of the slot according to the following (yet incomplete) lists:

- ACMP: *bez+2, s+7, společně s+7, spolu s+7, v čele s+7, v souvislosti s+7, ve spojení s+7, včetně+2, ...*;
- AIM: *aby, ať, do+2, k+3, na+4, o+4, pro+4, pro případ+2, proti+3, v zájmu+2, za+4, za+7, že, ...*;
- BEN: *3, na+4, na účet+2, na úkor+2, na vrub+2, pro+4, proti+3, v+4, ve prospěch+2, v rozporu, s+7, v zájmu+2 ...*;
- CAUS: *7, aby, adverb, díky+3, jelikož, ježto, k+7, kvůli+3, na+4, na+6, na základě+2, nad+7, následkem+2, od+2, pod+7, pod nápirem+2, pod tíhou+2, pod váhou+2, poněvadž, pro+4, proto, protože, v+6, v důsledku+2, v souvislosti s+7, vinou+2, vlivem+2, vzhledem k+3, z+2, z důvodu+2, za+4, za+7, zásluhou+2, že, ...*;
- CRIT: *7, 2, dle+2, podle+2, na+6, na základě+2, po vzoru+2, přiměřeně+3, v+6, v duchu+2, v rozporu s+7, v souladu s+7, v souhlase s+7, v závislosti na+6, ve shodě s+7, ve smyslu+2, ve světle+2, z titulu+2, ...*;
- DIR1: *adverb, od+2, s+2, z+2, ze strany+2, zpod+2, zpoza+2, zpřed+2, ...*;
- DIR2: *7, adverb, kolem+2, cestou+2, mezi+7, napříč+7, po+6, podél+2, přes+4, skrz+4, v+6, ...*

⁴Form *zda* is in fact an abbreviation for the couple of conjunctions *zda* and *jestli*.

- DIR3: 7, adverb, do+2, do čela+2, k+3, kolem+2, mezi+4, mimo+4, na+4, na+6, nad+4, naproti+3, okolo+2, po+4, po+6, pod+4, proti+3, před+4, přes+4, směrem do+2, směrem k+3, směrem na+4, v+4, vedle+2, za+4, za+7, ...;
- EXT: adverb, 2, 4, 7, do+2, kolem+2, k+3, na+4, na+6, nad+4, okolo+2, po+6, pod+7, přes+4, v+4, z+2, za+4, ...;
- LOC: adverb, blízko+2, blízko+3, daleko+2, do+2, kolem+2, mezi+7, mimo+4, na+4, na+6, na úroveň+2, nad+7, naproti+3, nedaleko+2, okolo+2, po+6, po bok+2, poblíž+2, pod+7, podél+2, proti+3, před+7, přes+4, při+6, stranou+2, u+2, uprostřed+2, uvnitř+2, v+6, v čele+2, v oblasti+2, v rámci+2, v řadě+2, vedle+2, za+4, za+7, ...;
- MANN: 7, adverb, do+2, formou+2, na+4, na+6, nad+4, o+4, po+6, pod+7, proti+3, před+7, při+6, přes+4, s+7, v+4, v+6, v podobě+2, ve formě+2, vedle+2, z+2, za+4, za+7, jak, že ...;
- MEANS: adverb, 7, cestou+2, díky+3, do+2, na+4, na+6, o+6, po+6, pod+7, pomocí+2, prostřednictvím+2, přes+4, s+7, s pomocí+2, v+6, z+2, za+4, skrz+2, za pomoci+2, že, ...;
- REG: adverb, 7, bez ohledu na+4, bez zřetele k+3, k+3, kolem+2, na+4, na+6, na téma+2, nad+7, nezávisle na+6, o+6, ohledně+2, po+6, pro+4, před+7, při+6, s+7, se zřetelem k+3, se zřetelem na+4, s ohledem na+4, u+2, v+6, v otázce+2, v případě+2, v rámci+2, v souvislosti s+7, ve věci+2, ve vztahu k+3, vůči+3, vzhledem k+3, z+2, z hlediska+2, za+4, ...;
- SUBS: jménem+2, namísto+2, místo+2, výměnou za+4, za+4, ...;
- TFHL: adverb, do+2, na+4, po+2, pro+4, ...;
- TFRWH: z+2, od+2, ...;
- THL: adverb, 2, 4, 7, až, dokud, do+2, na+4, po+4, po dobu+2, přes+4, v+2, za+4, ...;
- TOWH: adverb, do+2, k+3, na+4, pro+4, ...;
- TSIN: adverb, od+2, počínaje+7, z+2, ...;
- TTILL: adverb, do+2, dokud, k+3, než, po+4, ...;
- TWHEN: 2, 4, 7, adverb, až, do+2, jakmile, k+3, když, kolem+2, koncem+2, mezi+7, na+4, na+6, na závěr+2, než, o+6, okolo+2, po+6, počátkem+2, postupem+2, poté co, před+7, předtím než, při+6, s+7, u příležitosti+2, v+4, v+6, v době+2, v období+2, v průběhu+2, v závěru, z+2, za+2, za+4, začátkem, ...;

5.3. Types of complementations

Within the FGD framework, valency frames (in a narrow sense) consist only of inner participants (both obligatory⁵ and optional) and obligatory free modifications; the dialogue test was introduced by [Panevová \(1974\)](#) as a criterion for obligatoriness, see also [Sgall, Hajičová,](#)

⁵It should be emphasized that in this context the term obligatoriness is related to the presence of the given complementation in the deep (tectogrammatical) structure, and not to its (surface) deletability in a sentence (moreover, the

and Panevová (1986). In VALLEX 2.0, valency frames are enriched with quasi-valency complementations. Moreover, a few non-obligatory free modifications occur in valency frames too, since they are typically related to some verbs (or even to whole classes of them) and not to others.

The attribute ‘type’ is attached to each frame slot and can have one of the following values: ‘obl’ or ‘opt’ for inner participants and quasi-valency complementations, and ‘obl’ or ‘typ’ for free modifications. In the printed version, optional complementations are marked with ‘?’, whereas typical complementations are marked with ‘?’.

5.4. Slot expansion

Some slots tend to occur systematically together. For instance, verbs of motion can be often modified with direction-to and/or direction-through and/or direction-from modifier. We decided to capture this type of regularity by introducing the abbreviation flag for a slot. If this flag is set (in the VALLEX 2.0 notation it is marked with an upward arrow), the full valency frame is obtained after slot expansion.

If one of the frame slots is marked with the upward arrow (in the XML data, attribute ‘abbrev’ is set to 1), then the full valency frame will be obtained after substituting this slot with a sequence of slots as follows:

- $\uparrow\text{DIR}^{typ} \rightarrow \text{DIR1}^{typ} \text{DIR2}^{typ} \text{DIR3}^{typ}$
- $\uparrow\text{DIR1}^{obl} \rightarrow \text{DIR1}^{obl} \text{DIR2}^{typ} \text{DIR3}^{typ}$
- $\uparrow\text{DIR2}^{obl} \rightarrow \text{DIR1}^{typ} \text{DIR2}^{obl} \text{DIR3}^{typ}$
- $\uparrow\text{DIR3}^{obl} \rightarrow \text{DIR1}^{typ} \text{DIR2}^{typ} \text{DIR3}^{obl}$
- $\uparrow\text{THL}^{typ} \rightarrow \text{TSIN}^{typ} \text{THL}^{typ} \text{TTIL}^{typ}$

6. Optional LU attributes

6.1. Control

The term ‘control’ relates in this context to a certain type of predicates (verbs of control) and two coreferential expressions, a ‘controller’ and a ‘controllee’, see also Panevová (1996). In VALLEX 2.0, control is captured in the data only in the situation in which a verb has an infinitive modifier (regardless of its functor). Then the controllee is an element that would be a ‘subject’ of the infinitive (which is structurally excluded on the surface), and controller is the co-indexed expression. In VALLEX 2.0, the type of control is stored in the frame attribute ‘control’ as follows:

- if there is a coreferential relation between the (unexpressed) subject (‘controllee’) of the infinitive verb and one of the frame slots of the head verb, then the attribute is filled with the functor of this slot (‘controller’);

relation between deep obligatoriness and surface deletability is not at all straightforward in Czech).

- otherwise (i.e., if there is no such coreference), value ‘ex’ is used.

Examples:

- *pokusit se* – to try, e.g. *Jiří se pokusí přijít* – Jiří will try to come, control: ACT;
- *slyšet* – to hear, e.g. *děti slyší někoho přicházet* – children hear somebody coming, control: PAT;
- *jit*, in the sense *jde to udělat* – it is possible to do it, control: ex.

6.2. Reflexivity

The optional attribute reflexivity (abbreviation ‘rfl’) indicates possible syntactic functions of the reflexive particles/pronouns *se* or *si*.

The reflexive particles/pronouns *se* or *si* are used in Czech as formal means expressing the following syntactic constructions:

- derived diatheses: the particle *se* is a part of the reflexive passive verb form:
 - for transitive verbs (e.g. *plány se připravují* – plans are prepared); marked with the label ‘pass’;
 - for intransitive verbs (e.g. *pátrá se po zloději* – a thief is being looked for; *v neděli se chodí do kostela* – on Sundays one visits the church); marked with the label ‘pass0’.
- grammatical coreference: the pronouns *se* or *si* stands for an inner participant that is coreferential with Actor (e.g. *mýt se* – to wash oneself, coreference between ACT and PAT (in Accusative); *podřídít si zaměstnance* – to bring under the employees, coreference between ACT and ADDR in dative); marked with the labels ‘cor3’ (in the case of *si*) or ‘cor4’ (in the case of *se*).

Note that the attribute reflexivity does not cover reflexive verb forms where reflexive particles *se* or *si* are parts of the infinitive forms, i.e. reflexiva tantum (e.g. *bát se* – to fear, *smát se* – to laugh) as well as derived reflexive (e.g. *odpovídat se* – to account, *šířit se* – to spread, *vrátit se* – to return) (as already discussed in Section 3.1), nor the reciprocal function of *se* or *si* pronouns (see the following Section).

6.3. Reciprocity

Reciprocity is understood as a possibility of (two or more) valency complementations to be in relations with each other that may be viewed symmetrically (and their roles are interchangeable).

In Czech, if Actor and some other complementation are reciprocal, then the reflexive verb form is used and these two complementations are expressed either as a coordinated nominal group (as in *Petr a Marie se hádali* – Peter and Mary argued (with one another)), or as a plural noun (*přátelé se navštěvují* – friends visit each other), possibly with additional adverbs *spolu*, *navzájem*,

If Actor is not affected, the reciprocity may follow from the plural form or coordination (with no other formal sign), as in *seznámil je* – he introduced them (to each other).

The possibility of reciprocal usage is indicated in the attribute reciprocity ('rcp' for short), the value of which is a pair (or triple) of functors involved, e.g. ACT-ADDR for *hádat se* – to argue, *neustále se spolu hádali* – they argued with each other all the time; or ACT-ADDR-PAT for *mluvit* – to talk, *mluví spolu o sobě* – they talked with each other about themselves.

In the case of derived reflexive lexemes of inherently reciprocal verbs (with the obligatory complementation in the form s+7), both LUs for irreflexive and reflexive lexemes are assigned attribute 'rcp'.

Examples:

- ACT-PAT for *navštěvovat*, *navštívit* (^{impf} *navštěvovali se vzájemně*, ^{pf} *navštívit se navzájem* – they visited each other);
- ACT-PAT for *navštěvovat se* (*navštěvovali se pravidelně celá léta* – they visited each other for all the years).

6.4. Semantic class

A significant part of lexical units (2,903 LUs out of 6,460, i.e. 45% of all LUs) is assigned with semantic classes. These classes were built strictly in a 'bottom-up' way, by grouping LUs with similar syntactic property and with respect to their semantics. The following 22 semantic classes were established:

- appoint verb (23 LUs), e.g. *nominovat* – to nominate, *určovat*, *určit* – to assign (as in *určila ho za svého zástupce* – she assigned him as her assistant), *ustanovovat*, *ustanovit* – to appoint, ...;
- cause motion (43 LUs), e.g. *hýbat*, *hnout*, *hýbnout* – to move (as in *hnul pravou rukou* – he moved his right hand), *mávat*, *mávnout* – to wave, *vrhat* – to throw, ...;
- combining (96 LUs), e.g. *míchat* – to mix, *přidat*, *přidávat* – to add, *spojit*, *spojovat* – to join/to combine, ...;
- communication (364 LUs), e.g. *číst* – to read, *hovořit* – to talk, *nařizovat*, *nařídít* – to command, *pochybovat* – to hesitate/to question, ...;
- contact (115 LUs), e.g. *dotýkat se*, *dotknout se* – to contact, *narážet*, *narazit* – to hit (against sth), *tisknout* – to press, ...;
- emission (22 LUs), e.g. *pouštět*, *pustit* – to run (as in *tričko pustilo barvu* – the shirt lost color), *vysílat*, *vyslat* – to radiate/to emit, ...;
- exchange (177 LUs), e.g. *dávat*, *dát* – to give, *dostávat*, *dostat* – to get, *platit* – to pay, *pronajímat*, *pronajmout* – to let, ...;
- expansion (19 LUs), e.g. *pronikat*, *proniknout* – to spread, *šířit* – to diffuse/to disseminate, ...;
- extent (20 LUs), e.g. *činit* – to amount, *dosahovat*, *dosáhnout* – to reach, *vycházet*, *vyjít* – to cost/to come to (as in *boty vyjdou na tisíc korun* – shoes come to one thousand crowns), ...;
- change (318 LUs), e.g. *budovat* – to build, *klesat*, *klesnout* – to fall (as in *teplota klesla*

- pod bod mrazu* – the temperature fell below freezing point), *proměňovat, proměnit* – to change, *růst* – to grow, *vytvářet, vytvořit* – to create, ...;
- intervention (10 LUs), e.g. *zasahovat* – to meddle, *mluvit* – to speak/to interfere (as in *do toho nemůžu mluvit* – I have no voice in this), ...;
 - location (399 LUs), e.g. *doplňovat, doplnit* – to add, *nacházet, najít* – to find, *shromažďovat* – to gather, ...;
 - mental action (304 LUs), e.g. *cítit se* – to feel (as in *cítit se dobře* – to feel fine), *jásat* – to exult, *mrzet* – to be sorry, ...;
 - modal verb (15 LUs), e.g. *dověst* – to be able, *chtít* – to want, ...;
 - motion (309 LUs), e.g. *běžet* – to run, *dorážet, dorazit* – to arrive, *hýbat se* – to move (as in *Nehýbej se!* – Don't move!), ...;
 - perception (104 LUs), e.g. *hledět* – to look, *pamatovat* – remember, *všimat se, všimnout si* – to notice, ...;
 - phase of action (80 LUs), e.g. *končit* – to end (as in *zde les končí* – here the forest ends), *vrcholit* – to culminate, *vznikat, vzniknout* – to arise, ...;
 - phase verb (76 LUs), e.g. *iniciovat* – to initiate, *končit* – to end (as in *končit školu* – to finish the school), *najet* – to cover (as in *najeli aspoň 500 mil* – they covered at least 500 miles), ...;
 - providing (51 LUs), e.g. *naplňovat, naplnit* – to fill/to replenish, *oloupávat, olupovat, oloupnout, olupat* – to peel (as in *oloupat ovoce* – to peel fruit), *vybavovat, vybavit* – to equip, ...;
 - psych verb (83 LUs), e.g. *klamat* – to deceive, *těšit* – to pleasure, ...;
 - social interaction (86 LUs), e.g. *potkávat se, potkat se* – to meet (as in *potkává se s přáteli v baru* – he used to meet his friends in bar), *spojovat se, spojit se* – to interconnect/to get in touch (as in *spojím se s ním co nejdříve* – I will get in touch with him as soon as possible), *souhlasit* – to agree, ...;
 - transport (189 LUs), e.g. *donášet, donést* – to bring/to carry, *přemísťovat/přemíšťovat, přemístit* – to move, *shrňovat, shrnout* – to heap, ...

We admit that this classification is tentative and should be understood merely as an intuitive gathering of frames, rather than a properly defined ontology. The motivation for introducing such semantic classification in VALLEX 2.0 was the fact that it simplifies systematic checking of consistency and allows for making more general observations about the data.

6.5. Idioms

When building VALLEX, we have focused mainly on primary or usual meanings of verbs. We also noted many LUs corresponding to peripheral usages of verbs. However, their coverage in VALLEX might not be complete. We call such LUs idiomatic and mark them with the label ‘idiom’. An idiomatic frame is tentatively characterized either by a substantial shift in

meaning (with respect to the primary sense), or by a small and strictly limited set of possible lexical values in one of its complementations, or by occurrence of another type of irregularity or anomaly.

7. Final remarks

The preparation of the presented version of VALLEX has taken more than five years. The primordial aim of this work was to create a publicly available high-quality NLP-oriented lexical resource focused on valency properties of Czech verbs. We believe that this goal has been achieved: VALLEX 2.0 is a formally structured large-coverage lexicon available in both human readable and machine tractable form. We also hope that our attempt at accumulating dispersed linguistic knowledge relevant for valency, as well as the stress laid on the consistency of the description of regular properties of lexical units, have contributed to the user value of the lexicon. On the other hand, the data-oriented approach to valency inquiries shows that there are still open theoretical questions requiring further linguistic research.

Acknowledgement

When creating VALLEX 2.0, we have used the following Czech dictionaries (some of them via the dictionary browser DEBDict⁶):

- BRIEF, Pala and Ševeček (1997);
- Slovník spisovné češtiny, SSČ (2003);
- Slovník spisovného jazyka českého, SSJČ (1964);
- Slovesa pro praxi, Svozilová, Prouzová, and Jirsová (1997);
- Slovník slovesných, substantivních a adjektivních vazeb a spojení, Svozilová, Prouzová, and Jirsová (2005).

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⁶<http://nlp.fi.muni.cz/projekty/deb2/debdict/index.html>

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Appendix

The screenshot shows the VALLEX 2.0 web interface in a Mozilla browser window. The browser address bar shows the file path: file:///C:/Documents%20and%20Settings/lopatkova/Dokum... The page title is 'VALLEX 2.0'. The main content area displays the lexeme 'odpovídat^{impf}, odpovědět^{pf}' and lists four numbered entries:

- 1 ≈ odvětit; dávat odpověď
-frame: ACT₁^{obl} ADDR₃^{obl} PAT_{na+4}^{opt} EFF_{4,aby,at,zda,že,cont}^{obl} MANN₇^{typ}
-example: impf: odpověděl mu na jeho dotaz pravdu / činem / smíchem / že ... pf: odpověděl mu na jeho dotaz pravdu / činem / smíchem / že ... cor3: impf: na své otázky si sám odpovídal, nikdo jiný toho nebyl schopen pf: hned si sám na nevyřčenou otázku odpověděl pass: impf: na dotazy posluchačů se v našem pořadu odpovídá po jedenácté hodině pf: odpověděla se jim pravda -rcp: ACT-ADDR: impf: odpovídali si navzájem na dotazy pf: odpověděli si navzájem na dotazy -class: communication
- 2 ≈ jen odpovídat^{impf} reagovat
-frame: ACT₁^{obl} PAT_{na+4}^{obl} MEANS₇^{typ}
-example: pokožka odpovídala na chlad zarudnutím
- 3 ≈ jen odpovídat^{impf} mit odpovědnost
-frame: ACT₁^{obl} ADDR₃^{opt} PAT_{za+4}^{obl} MEANS₇^{typ}
-example: odpovídá za své děti; odpovídá za ztrátu svým majetkem -rcp: ACT-ADDR-PAT: odpovídají si za sebe navzájem
- 4 ≈ jen odpovídat^{impf} být ve shodě / v souladu; korespondovat
-frame: ACT_{1,že}^{obl} PAT₃^{obl} REG₇^{typ}
-example: řešení odpovídá svými vlastnostmi požadavkům -rcp: ACT-PAT:

The left sidebar contains a list of letters from A to Ž with their respective counts in parentheses. The 'O' entry (392) is highlighted, indicating the current page's focus.

Figure 2. The screenshot of the lexeme *odpovídat^{impf}, odpovědět^{pf}* – to answer/to react/to be responsible/to correspond.

- impf*¹ koncert odpadá; *impf*² každou chvíli jím odpadá hodina češtiny; *pf*¹ koncert odpadl
4 jen odpadat *pf*² (poddám se oddělit) ACT(1) ◊ nekválitní náter brzo odpadá
- odpírat / odepírat** *impf*, **odepřít** *pf* v (*impf* neposkytovat; nečinit něco žádaného; odmítat; odřikat; *pf* neposkytnout; neučinit něco žádaného; odmítnout; odřít) ACT(1) ADDR(3) PAT(4) [in] [ab] ◊ *impf* odpíral pomoc / poslušnost; odpíral vojenskou službu; *pf* odepřel jim pomoc / poslušnost ✚ control: ACT, ADDR; rfl: cor3, pass; rcp: ACT-ADDR; class: exchange
- odpočinout si** *pf* v (oddechnout si; oddat se klidu) ACT(1) ?PAT(odd+2) ◊ vyděla, že si musí od dět odpočinout; před cestou si trochu odpočineme ✚ rcp: ACT-PAT
- odpočívát** *impf*, **odpočinout** *pf* v
1 jen odpočívát *impf* (oddychovat si; oddávat se klidu; ležet; spočívat) ACT(1) ;LOC ◊ po narození dnu musel chvíli odpočívát; nechce řádo odpočívát; ruce odpočívaly na klíně ✚ rfl: pass0
2 (*impf* poskytovat odpočinek; *pf* poskytnout odpočinek; pohovět) ACT(1) PAT(3) ◊ *impf* odpočívá očím / tělu; *pf* odpočinout očím / tělu ✚ rfl: pass0
- odporovat** *impf* v (tvrdit opak; protřečít) ACT(1) PAT(3) ;FEG(v+6) ◊ pořádk tathkovi odporoval; to tvrzení odporuje zdravému rozumu ✚ rfl: cor3, pass0; rcp: ACT-PAT
- odpouštět** *impf*, **odpustit** *pf* v
1 (*impf* přestávat se zlobit; *pf* přestat zazlívát) ACT(1) ADDR(3) PAT(4) [je] [com] ◊ *impf* maminka synovi všechno odpouštěla; *pf* odpustil mu, že nepřijel ✚ rfl: cor3, pass; rcp: ACT-ADDR; class: mental action
2 (*impf* nevyvádět; *pf* slevit; prominout) ACT(1) ADDR(3) PAT(4) ◊ *impf* odpouštěl svým dlužníkům pohledávky; *pf* odpustil mu dluh ✚ rfl: pass; rcp: ACT-ADDR; class: exchange
- odpouštět** *impf*, **odpustit** *pf* v (*impf* vypouštět část; *pf* vypustit část) ACT(1) PAT(4) DIR1 ◊ *impf* odpouštěli pomalu vodu z rybníku; *pf* odpustili třetímu vodu z nádrže ✚ rfl: pass; class: location
- odpouštět si** *impf*, **odpustit si** *pf* v idiom (*impf* opomfjet; *pf* opomenout) ACT(1) PAT(4) [ab] ◊ *impf* neodpustit si poznámky na své blízké; *pf* nemohl si odpustit tuto poznámku
- odpoutávat** *impf*, **odpoutat** *pf* v
1 (*impf* odhazovat; uvolňovat; *pf* odházat; uvolnit) ACT(1) PAT(4) DIR1 ◊ *impf* odpoutávat balon; odpoutávat koně od žlabu; *pf* odpoutat balon; odpoutat psa ze řetězu ✚ rfl: cor4, pass; rcp: ACT-PAT
2 (*impf* přenášovat spojení/závislost; uvolňovat; *pf* přenést spojení/závislost; uvolnit) ACT(1) PAT(4) ORIG(odd+2) ◊ *impf* odpoutával pozornost od vnějšího světa (SSJČ); její přítomnost stále odpoutává jeho pozornost; *pf* nemohl od ní oči odpoutat ✚ rfl: pass; rcp: ACT-ORIG
- odpoutávat se** *impf*, **odpoutat se** *pf* v (*impf* uvolňovat se; *pf* existenci se) ACT(1) PAT(odd+2) ◊ *impf* odpoutával se od existenčních starostí; *pf* odpoutal se od svých radostí
- odpovídat** *impf*, **odpovědět** *pf* v
1 (odvětit; dávat odpověď) ACT(1) ADDR(3) ?PAT(na+4) EFF(4) [ab] [at] [za] [je] [com] ;MANN ◊ *impf* odpovídal mu na jeho dotaz pravdu / činem / smíchem / že ...; *pf* odpověděl mu na jeho dotaz pravdu / činem / smíchem / že ... ✚ rfl: cor3, pass; rcp: ACT-ADDR; class: communication
2 jen odpovídat *impf* (reagovat) ACT(1) PAT(na+4) ;MEANS(7) ◊ pokozka odpovídala na chlad zarudnutím
3 jen odpovídat *impf* (mít odpovědnost) ACT(1) ?ADDR(3) PAT(z+4) ;MEANS(7) ◊ odpovídá za své děti; odpovídá za ztrátu svým majetkem ✚ rcp: ACT-ADDR-PAT
4 jen odpovídat *impf* (být ve shodě / v souladu; korespondovat) ACT(1) [je] PAT(3) ;FEG(7) ◊ řesent odpovídá svými vlastnostmi požadavkům ✚ rcp: ACT-PAT
- odpovídat se** *impf* v (být zodpovědný) ACT(1) ADDR(3) PAT(z+2) ◊ odpovídá se že ztrát
- odrazovat** *impf*, **odradit** *pf* v (*impf* odvracet od úmyslu / zámý; *pf* odvrátit od úmyslu / zámý; odstranit) ACT(1) [in] [je] [com] ADDR(4) ?PAT(odd+2) ;MEANS(7) ◊ *impf* otec ho odrazoval od cesty do Jižní Ameriky; odrazovalo ho, že je celý projekt finančně neprůhledný; *pf* neúspěch mě nikdy neodradil; odradilo ho stále hrát jen druhé housle ✚ control: PAT; rfl: pass; rcp: ACT-ADDR; class: psych verb
- odrážet** *impf*, **odrazit** *pf* v
1 (*impf* uvádět do pohybu (jiným směrem); *pf* uvést do pohybu (jiným směrem)) ACT(1) PAT(4) ;MEANS(7) ◊ *impf* odrážet rukama míč; *pf* odrazit rukama míč ✚ rfl: pass; class: contact
2 (*impf* potlačovat; zastavovat; *pf* potlačit; zastavit) ACT(1) PAT(4) ◊ *impf* armáda zadržela útoky; *pf* armáda odrazila útok ✚ rfl: pass
3 (*impf* odpoutávat se od břehu; *pf* odpoutat se od břehu) ACT(1) ↑DIR1 ◊ *impf* loď odrazila od břehu; *pf* loď odrazila od břehu ✚ rfl: pass0; class: motion
4 jen odrážet *impf* (zobrazovat odrazem) ACT(1) PAT(4) ◊ mýtus odrážel vládu
5 jen odrážet *impf* (způsobovat optický odraz) ACT(1) PAT(4) ◊ bílá barva odrážel slunce
6 idiom jen odrážet *pf* (nechat zteplat) ACT(1) PAT(4) ◊ nechat odrážet mléko ✚ rfl: pass
- odrážet se** *impf*, **odrazit se** *pf* v
1 (*impf* nárazem dostávat jiný směr; mít odraz; *pf* nárazem dostat jiný směr; mít odraz) ACT(1) ↑DIR1 ◊ *impf* míče se odrážely od stěny; odrážel se od hladiny; *pf* míč se odrazil od země; odrazil se od hladiny ✚ class: motion
2 (*impf* projevovat se; mít důsledky; *pf* projevit se; mít důsledky) ACT(1) PAT(na+6) [v+6] ◊ *impf* zvýšené životní úroveň se odrážel i v lepší vybavenosti domácností; *pf* zvýšené životní úroveň se odrazilo i v lepší vybavenosti domácností
3 (mít odraz) ACT(1) LOC ◊ *impf* paprsky se odrážely ve vodě; *pf* obraz se odrazil na hladině ✚ class: location
- odročovat** *impf*, **odročit** *pf* v (*impf* odkládat; stanovovat na pozdější dobu; *pf* odložit; stanovovat na pozdější dobu) ACT(1) PAT(4) ;TFRMH(z+2) ;TOWH(na+4) ;DIFF(odd+4) ◊ *impf* nemůžeme stále do nekonečna odročovat jednání; *pf* soudce odročil jednání o místě ✚ rfl: pass
- odřezávat** *impf*, **odřeznout** *pf*¹, **odřezat** *pf*² v

Figure 3. Sample page from the printed version of the lexicon.

