Variability of languages in time and space

Word formation across languages
Approaches to cross-linguistic study of word formation

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Word formation

Štekauer & Lieber (2005:212)

"Word-formation deals with productive and rule-governed patterns (word-formation types and rules, and morphological types) used to generate motivated naming units in response to the specific naming needs of a particular speech community by making use of word-formation bases of bilateral naming units and affixes stored in the Lexical Component."

Word formation vs. formation of word forms

BNC via KonText `[word="treat.*"]`

1	treatment	11,609
2	treated	6,914
3	treat	3,527
4	treaty	2,957
5	treating	1,260
6	treatments	839
7	treaties	570
8	treats	534
9	treatise	160
10	treatises	58
11	treatable	43

SYN2015 via KonText `[word="lé[kč].*"]`

1	lékař	4,758
2	lékaři	4,400
3	lékaře	4,095
4	léky	3,320
5	lékařů	3,005
6	lékařské	1,988
7	léčby	1,918
8	léků	1,840
9	léčbu	1,814
10	léčbě	1,600
11	lék	1,562

BNC via KonText `[lemma="treat.*"]`

1	treatment	12,985
2	treat	12,312
3	treaty	5,626
4	treatise	283
5	treated	164
6	treatable	43
7	treaty-making	20
8	treatment-room	10
9	treatment-resistant	3
10	treating	3
11	treaty-based	3

SYN2015 via KonText `[lemma="lé[kč].*"]`

1	lékař	12	léčebna
2	lék	13	lékárník
3	léčba	14	lékařství
4	lékařský	15	léčitel
5	léčit	16	léčený
6	lékárna	17	lékárnička
7	léčebný	18	léčka
8	léčivý	19	léčitelství
9	léčení	20	lékový
10	léčivo	21	lékopis
11	lékařka	22	lékařův

- Morphemes in word formation
- Word-formation processes
    1. Adding bound lexical morphemes (affixation)
    2. Combining free lexical morphemes (compounding etc.)
    3. Without addition of derivational material (conversion etc.)
- Approaches to cross-linguistic study of word formation
    - Productivity-based approaches
    - Attestedness of word-formation processes across languages
    - Derivational potential of a sample of underived words

Types of morphemes

two oppositions combined:

- **grammatical** vs **lexical** morphemes
  - grammatical morphemes change inflection
  - lexical morphemes have (more or less general) lexical meanings on their own
- **bound** vs **free** morphemes
  - a bound morpheme cannot stand alone
  - a free morpheme can stay as a single word

Grammatical morphemes: free vs bound

- **bound grammatical morphemes**
  - = "inflectional morphemes" (endings etc.)
  - add inflectional features without changing lexical meaning: used to create word forms of a given lexeme with the same lexical meaning but different inflections
  - often more than one inflectional meaning (portmanteaus)
  - occur outside derivational morphemes

  e.g. *play-s*, *play-ed*, *play-ing*; *play-er-s*, *book-s*, *dis-lik-ed*
- **free grammatical morphemes**
  - = "function words"

  e.g. *in a book*, *but*, *that*, *them*

Lexical morphemes: free vs bound

lexical morphemes have a lexical meaning by themselves

- **free lexical morphemes**
  - = "content words" (roots and stems)
  - e.g. *book*, *book-s*, *play*, *play-er-s*
- **bound lexical morphemes**
  - = "derivational morphemes" (derivational prefixes, suffixes etc.)
  - cannot be used separately
  - combined (as **affixes**) with free morphemes to form a new word
  - change the meaning and/or the part-of-speech category of words
  - have specialized meanings, added in succession
  - derivational suffixes occur before inflectional morphemes
  - e.g. *book-ish*, *play-er-s*, *dis-lik-ed*; Cz. *uči-tel-k-a*

Morphemes around the root(s)

- En. *chair*, *chairs*, *dismissed*; Cz. *nahořklý* 'slightly bitter', *neuvěřitelný* 'unbelievable'

prefix	root	suffix
	chair	
	chair-	*-s*
dis-	*-miss-*	*-ed*
na-	*-hořk-*	*-lý*
ne- u-	*-věř-*	*-i- -teln- -ý*

- Ger. *Abschlussprüfung* 'final exam', *Jahresabschluss* 'end of the year'; Cz. *modrooký* 'blue-eyed'

prefix	root	interfix	prefix	root	suffix
Ab-	*-schluss-*			*-prüf-*	*-ung*
	Jahr-	*-es-*	*-ab-*	*-schluss*	
	modr-	*-o-*		*-ok-*	*-ý*

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Word-formation processes

- Štekauer et al. (2012) distinguish three groups of word-formation processes according to which type of morphemes is used:
  1. adding bound lexical morphemes (derivational affixes)
     = affixation / derivation
     1.1 prefixation
     1.2 suffixation
     1.3 circumfixation
     1.4 infixation
  2. combinig free morphemes (roots):
     2.1 compounding
     2.2 reduplication
     2.3 blending
  3. without addition of derivational material:
     3.1 conversion
     3.2 stress, tone/pitch

1. Affixation / derivation

= formation of new lexemes by **adding bound lexical morphemes** to a morpheme or to a word in order

(a) to **change its part-of-speech category**

bad.adj $>$ $bad\underline{ly}$.adv
$špatný$ 'bad' $>$ $špatn\underline{ě}$ 'badly'

(b) to **modify or add a non-grammatical meaning to it**

$child$.noun $>$ $child\underline{hood}$.noun
$učitel$ 'teacher' $>$ $učitel\underline{ka}$ 'female teacher'

(c) to do **both**

$child$.noun $>$ $child\underline{ish}$.adj
$dítě$ 'child' $>$ $dět\underline{ský}$ 'childish'

Direction in derivation

base word = the input of derivation *vs* **derivative** = the output of derivation

the derivative is based both formally and semantically on the base word
= **motivation**

- the base word expected to have a **simpler morphemic structure** than the derivative
- the base word expected to have a **broader meaning** than the derivative
- plus other features be employed, e.g. corpus frequency
  - the base word is often **more frequent** than the derivative
    child (47,629) > *child<u>hood</u>* (642) "state/period of being a child"
    large (26,212) > *to <u>en</u>large* (503) "to make larger"

    (absolute freq from the InterCorp corpus v10; Klégr et al. 2017)

1.1 Prefixation

= a bound morpheme (prefix) is attached to the front of a word or of a free morpheme

- in English (Bauer 1983)
  - majority of prefixes of Latin and Greek origin

    $moral > \underline{a}moral$, $act > \underline{inter}act$
  - native prefixes from prepositions

    $line > \underline{under}line$, $load > \underline{over}load$
  - a continuum between prefixes and first parts of compounds (*neoclassical formations*): $psycho$-, eco-, $techno$-
- in Slavic languages
  - mostly without changing the part-of-speech category

    $veliký$.adj 'big' $> \underline{pře}veliký$.adj 'very big'
    $psát$.verb 'write' $> \underline{za}psat$.verb 'write down'
  - highly productive with verbs

    Cz. $psát$ 'write' $> \underline{do}psat$ 'finish writing' | $\underline{při}psat$ 'add by writing' | $\underline{vy}psat$ 'excerpt' | $\underline{pode}psat$ 'sign' | $\underline{nade}psat$ 'entitle' | $\underline{u}psat\ (se)$ 'subscribe' | $\underline{ve}psat$ 'insert by writing'

1.2 Suffixation

= a bound morpheme (suffix) is attached to the end of a word or of a free morpheme
  - Cz. *učitel* 'teacher' > *učitel*$\underline{ka}$ 'female teacher'

- both as a class-maintaining or a class-changing process
  - Ger. *Tänzer*.noun 'dancer' > *Tänzer*$\underline{in}$.noun 'female dancer'
  - En. *work*.verb > *work*$\underline{er}$.noun

Multiple prefixation and suffixation

- words can be derived through a sequence of prefixation or suffixation steps applied successively
  - prefixation and suffixation
    En. $taste > tasteful > tastefully > distastefully$
    or $taste > tasteful > distasteful > distastefully$
  - multiple prefixation
    Cz. *skočit* 'jump' > *vyskočit* 'jump up' > *povyskočit* 'jump up a little'
  - multiple suffixation
    Cz. *strom* 'tree' > *stromek* 'small tree' > *stromeček* 'very small tree'

1.3 Circumfixation

= prefix and a suffix are added in one step

but neither the prefix and the root nor the suffix and the root are attested alone

- derivation of collective nouns in Tagalog (Štekauer et al. 2012):
  - *Intsik* 'Chinese person' > *kaintsikan* 'the Chinese'
  - *pulo* 'island' > *kapuluan* 'archipelago'
- derivation of adjectives of small portion of quality
  - Cz. *drzý* 'impudent' > *přidrzlý* 'slightly impudent', but neither **drzlý* nor **přidrzý* exist
  - must be distinguished from subsequent affixation:

    cf. suffixation followed by prefixation in Cz.
    otrávit.verb 'poison' > *přiotrávit*.verb 'poison partially' > *přiotrávený*.adj 'partially poisoned'

1.4 Infixation

= a bound morpheme (infix) inserted into a free morpheme

- an infix inserted before the last syllable to derive a negative in Hua (Štekauer et al. 2012):
  - *zgavo* 'embrace' > *zga-'a-vo* 'not embrace'
  - *harupo* 'slip' > *haru-'a-po* 'not slip'

2.1 Compounding

= two (or more) free morphemes are combined to form a new lexeme

- a compound prototypically consists of two parts
  - two root morphemes
    – first / left-hand part vs second / right-hand part
  - with or without a linking element
- attested across languages, but delimited differently
- borders to other areas are not clear-cut
  - to derivation
    – cf. elements *eco-*, *techno-*, *agro-* interpreted either as prefixes or as first parts of compounds
  - to syntax
    – cf. *flower pot*, *flower-pot*, *flowerpot* (Lieber – Štekauer 2009)

Delimiting compounds in English

- Lieber (2005) discusses criteria used for delimitation of compounds in English – most of them are problematic:
  - stress (on the first part)
    - *trúck driver*, *ápple cake* (but *apple píe*)
  - spelling
    - varies a lot: *daisy wheel*, *daisy-wheel*, *daisywheel*
  - lexicalized meaning
    - not applicable to new compounds
  - unavailability of the first part to inflection, anaphora and coordination
    - but *children's hour*, *medical and life insurance*
  - inseparability of the first and second part
    - *truck driver* – **truck fast driver*

2.2 Reduplication

= a free morpheme is repeated to form a new word

- attested both in derivation and in inflection
- more frequent in derivation
- different functions:
  - It. *neri neri* 'really black'
  - Cz. *šir-o-šir-ý* 'extremely vast'
  - Sp. *Es un coche-coche* (is-a-car-car) 'It is a very good car'
  - Indonesian *buah-buah-an* (fruit-fruit) 'various sorts of fruit'

2.3 Blending

= two free morphemes are reduced and joined to form a new word

- En. $\underline{smo}ke + \underline{fog} > smog$
- En. $\underline{br}eakfast + \underline{lunch} > brunch$

- the base morphemes often overlap in one ore more phonemes/graphemes
  - Fr. $\underline{photocopy} + \underline{pillage} > photocopillage$ 'illegal photocopying'
  - It. $\underline{cantan}te + \underline{autore} > cantautore$ 'singer-songwriter'

3.1 Conversion

= a new word is coined simply by the change of the part-of-speech category

– run.verb $>$ run.noun

- in languages with inflectional morphology, the change of the part-of-speech category can be seen as the change of the set of inflectional features (change of inflectional paradigm)

  = **transflexion**

  – Cz. $zlý$.adj 'evil' $>$ zlo.noun 'evil'

  – Ger. $schlafen$.verb 'sleep' $>$ $Schlaf$.noun 'sleep'

3.2 Stress and tone / pitch

- rarely, the replacement of stress is used to form new words
  - e.g. in Vietnamese, or
    En. $recórd$.verb $>$ $récord$.noun
    - rather classified as conversion

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Language typology of word-formation?
Comparing word-formation across languages

Körtvélyessy (2017:2):

"**Language typology** is a system or study that divides languages into smaller groups according to similar properties they have. [...] These smaller groups are called **language types**."

- detailed linguistic descriptions of word-formation systems available for esp. Indo-European languages
- only 1 derivational feature in *WALS*
  - reduplication as one of morphological features
- cross-linguistic study / linguistic typology of word formation very recent

Approaches to cross-linguistic study of word formation

i. productivity-based approaches
ii. attestedness of individual word-formation processes across languages
    - 55 languages from 28 families (Štekauer et al. 2012)
    - saturation value (Körtvélyessy 2016, Körtvélyessy et al. 2020)
iii. derivational potential of a sample of underived words in individual languages
    - 40 European languages (Körtvélyessy et al. 2020)

i. Productivity-based approaches

Productivity (Schultink 1961:113)

"the possibility for language users, by means of a morphological process which underpins a form-meaning correspondence in some words they know, to coin, unintentionally, a number of new formations which is in principle infinite"

- category-conditioned degree of productivity P $= n_1/\mathrm{N}$ (Baayen 1992)
  - n_1 number of hapax legomena with the particular suffix (words that occur just once in a corpus)
  - N token frequency (number of all tokens containing the suffix under analysis)
- hapax-conditioned degree of productivity P* $= n_{1,E,t}/h_t$ (Baayen 1993)
  - $n_{1,E,t}$ number of hapax legomena with a certain suffix
  - h_t total number of hapaxes in the corpus
  - "Denoting the number of hapaxes observed for category E after t tokens of the corpus have been sampled by $n_{1,E,t}$, and denoting the total number of hapaxes of arbitrary constituency in these t observations by h_t, we find that the required conditional probability, say P*, equals $n_{1,E,t}/h_t$."

ii. Attestedness of word-formation processes across languages

- Štekauer et al. (2012) studied word formation across **55 languages**
  – from 28 language families and 45 language genera (classification based on *WALS*)

  - similarities and differences among languages evaluated in terms of presence vs absence of individual word-formation processes
    – in which and in how many languages from the sample, a word-formation process is attested?

Typological conclusions by Štekauer et al. 2012

- some form of **derivation** attested in all but one languages in the sample of 55 languages
  - no affixation at all in Vietnamese (isolating language), only prefixation but no suffixation in Yoruba (isolating language)
  - the significance of derivation varies across languages (about 300 suffixes in Slovene, 1 genuine prefix in Finnish - negation)
- compounding
  - 91 % of languages in the sample
- reduplication found very frequently
  - 80 % of languages in the sample
- conversion
  - 62 % of languages in the sample
- stress and tone / pitch are minor in word formation
  - with 7 and 13 % of languages, respectively

Saturation value

- indicates the degree to which a particular word-formation system makes use of all the word-formation options under examination
  - for Slavic languages (Körtvélyessy 2016)
  - for 40 European langs (Körtvélyessy et al. 2020)
- which and how many word-formation processes are attested in a language
  - Körtvélyessy's study (2016) based on representative descriptions of particular word-formation systems in Müller et al. (2016)
- absence/presence of a word-formation process in a language (in POS terms)
- the productivity of a word-formation process not taken into consideration
  - cf. prefixation vs postfixation in Czech

Saturation value: prefixation in Slavic languages

Körtvélyessy (2016:483ff):

feature	mkd	bos	slv	hrv	srp	bul	hsb	pol	csb	ces	slk	ukr	bel	rus	SAT
N>N	X	X	X	X	X	X	X	X	X	X	X	X	X	X	14
V>V	X	X	X	X	X	X	X	X	X	X	X	X	X	X	14
A>A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	14
Adv>Adv				X	X					X	X	X	X	X	7
SAT	3	3	3	4	4	3	3	3	3	4	4	4	4	4	
A>N				X											1
V>N				X											1
Adv>N															0
A>V										X	X				2
N>V	X														1
Adv>V															0
N>A									X						1
V>A				X						X	X				3
Adv>A															0
N>Adv															0
V>Adv															0
A>Adv							X								1
SAT	1	0	0	3	0	0	1	0	1	2	2	0	0	0	
total SAT	4	3	3	7	4	3	4	3	4	6	6	4	4	4	

number of lang.: 14
number of features: 16
total saturation value: 59
average saturation value (total sat. value / number of lang.): 4.214
relative saturation value (total sat. value / (number of features * number of lang.)): 24.79 %

iii. Derivational potential of a sample of underived words

derivational networks in 40 European languages (Körtvélyessy et al. 2020)

- composed of an unmotivated word and all its direct and indirect derivatives
- unmotivated words selected from Swadesh list
  - 10 nouns: *bone, eye, tooth, day, dog, louse, fire, stone, water, name*
  - 10 verbs: *cut, dig, pull, throw, give, hold, sew, burn, drink, know*
  - 10 adjectives: *bad, new, black, straight, warm, old, long, thin, thick, narrow*
- three dimensions of the derivational network:

  1/ derivatives organized into **derivational series** (= a set of words directly motivated by the same base but not mutually motivating one another) ... horizontal dimension of the network
  2/ derivatives organized into **derivational paradigms** (= a set of words that share a common root and each of them motivates the item that immediately follows it) ... vertical dimension of the network
  3/ semantic category added through the affix ... semantic dimension

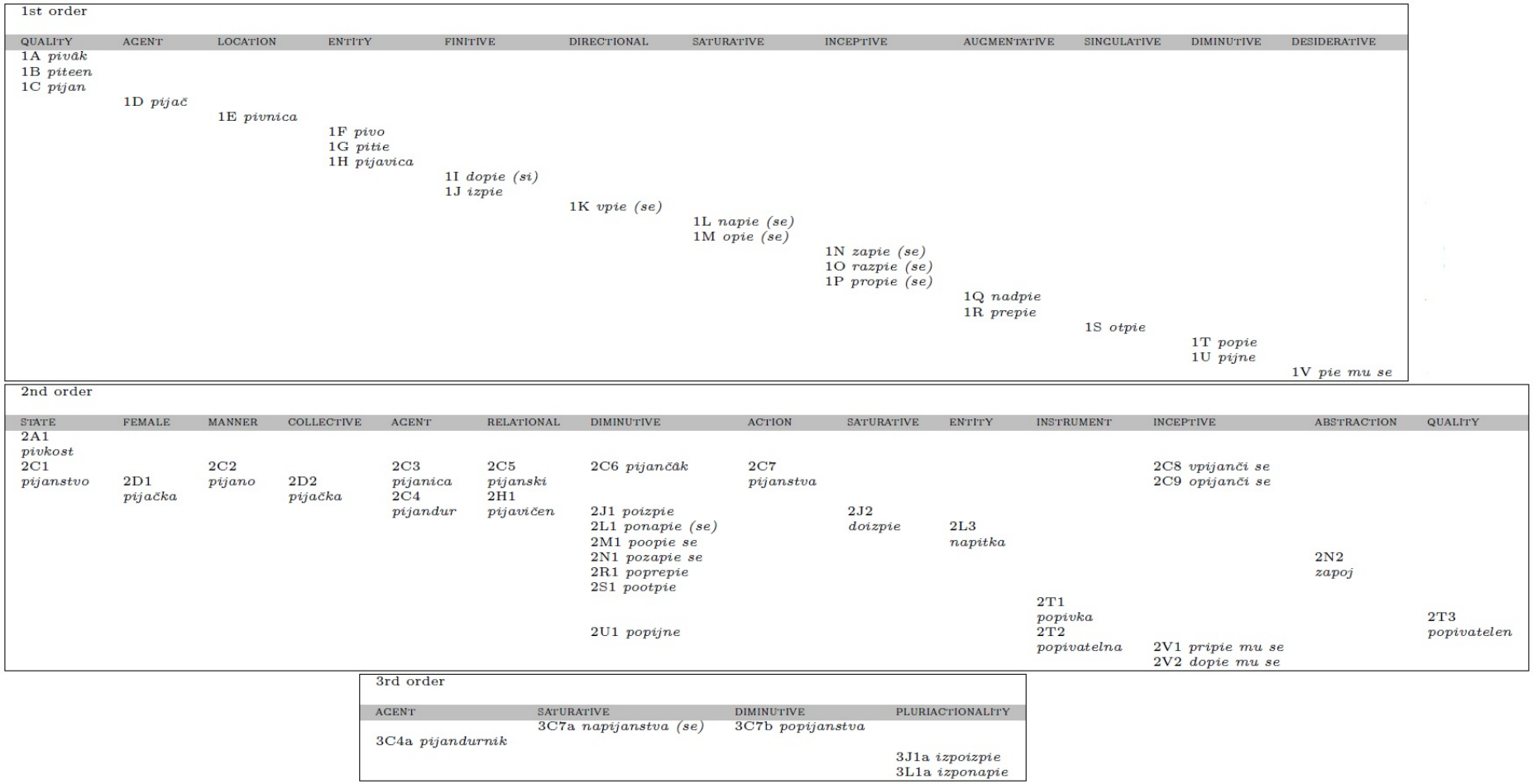
Semantic concepts in affixation

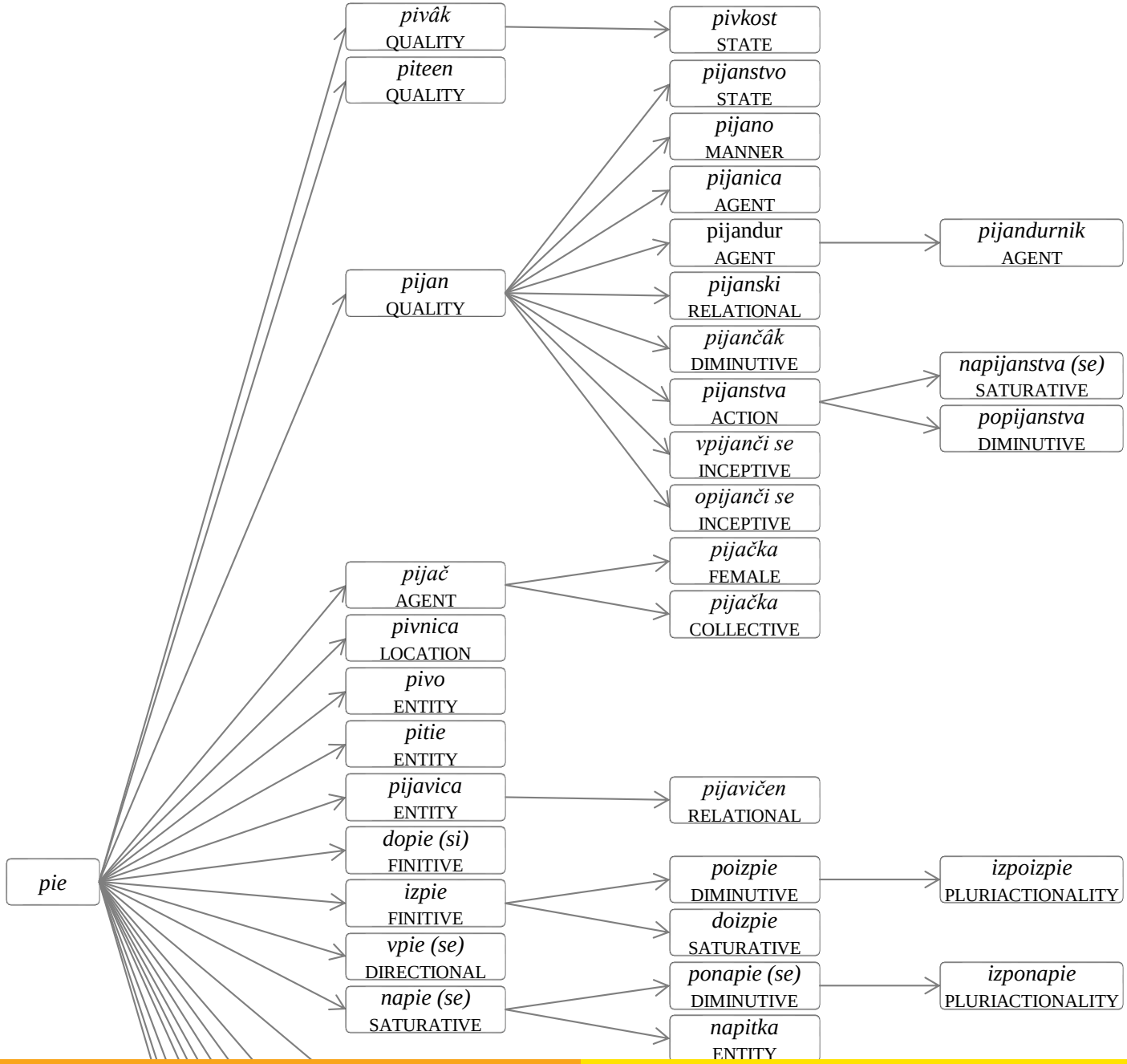
- 50+ comparative semantic categories applicable in cross-linguistic research into affixation (Bagasheva 2017)
  - what meaning is added by attaching the affix to the base word?

Action	En. *read**ing***, Bul. *strel**ba***
Agent	En. *kill**er***, Bul. *ubi**ec***
Abstraction	En. *just**ice***, Bul. *prav**da***
Causative	En. ***em**power*, Bul. ***za**liva*
Composition	Bul. *oreh**ovka***
Diminutive	En. *pig**let***, Bul. ***po**spya*
Hyperonymy	En. ***arch**bishop*, Bul. ***nad**reden*
...	

The derivational network of the Bulgarian verb *pie* ‘to drink’

(Körtvélyessy et al. 2020:13–16)

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PLURIACTIONALITY
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ENTITY

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