SUFFIX ORDERING IN ITALIAN AND RUSSIAN: A COGNITIVE APPROACH

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My research on affix ordering so far

- Languages analyzed
  - Slavic
    - Bulgarian (South Slavic)
    - Russian (East Slavic)
    - Polish (West Slavic)
  - Germanic
    - English
    - German
  - Romance
    - Italian
- Editor of papers on affix ordering in about 30 typologically diverse languages

Goal of the presentation

- To reveal the mechanisms behind suffix order
- Suffix ordering is discussed in terms of two-suffix combinations (morphological constructions) as in:
  - Russian: ***-n-* +*-ost'*** and **-ost-+-n-(yj)**

lico 'face' → *lič-n-yj* 'personal' →

→ *lič-n-ost'* 'person, personality' →

→ *lič-n-ost-n-yj* 'related to personality' →

→ *lič-n-ost-n-ost'* '(greater) personality'

- To define two-suffix constructions in morphology proper

Structure of the talk

- Preliminaries
  - Theoretical issues
  - Approaches to affix order
- A cognitive approach to affix order
- Suffix combinations in Italian
- Suffix combinations in Russian
- Two-suffix constructions
- Conclusions

Cognitive Grammar & Construction Morphology

Langacker (1987), Taylor (2002) & Geeraerts (2006), Booij (2010)

- Grammar is an inventory of units (phonological, semantic, or symbolic structure) that have been established, or entrenched, in the speaker's mind through ***frequency of previous use***.
- ***Entrenchment***: a unit does not need to be assembled from its parts on each occasion of its use, nor the language users need to refer to its parts in order to understand it.
- ***Constructions:*** WF patterns are abstract schemas (morphological constructions) that generalize over sets of existing complex words with a systematic correlation between form and meaning:

$[[a]_X\ b]_Y \leftrightarrow$ 'the property/state of X'

$[[x]_A$ ness$]_N \leftrightarrow$ 'the property/state of ADJ'

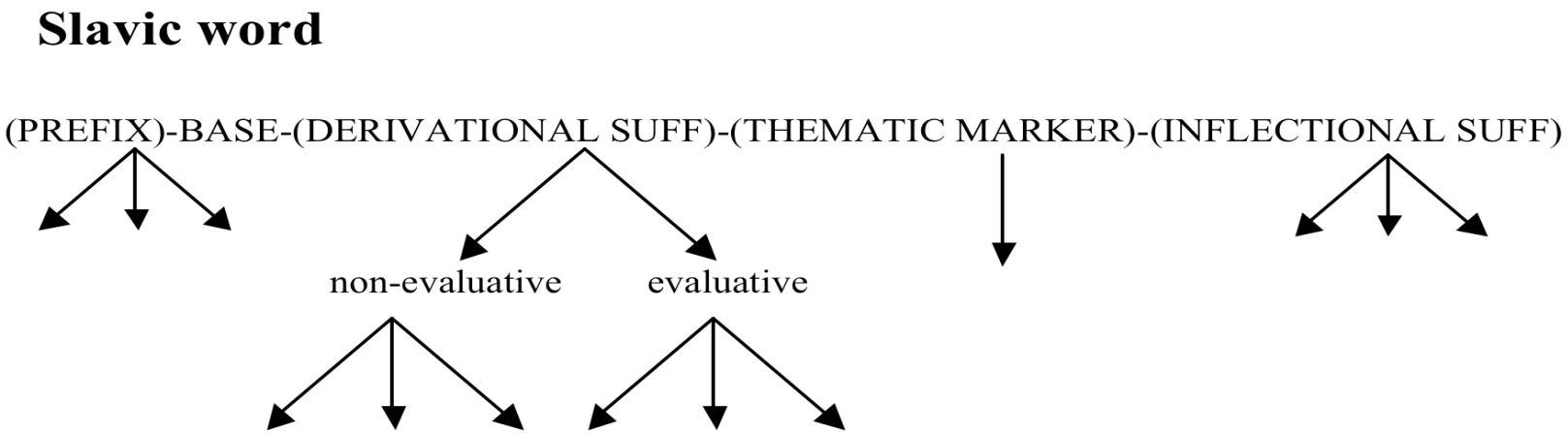
$[[\text{clear}]_A$ ness$]_N$

Approaches to affix order

- Overviews in Muysken (1986), Manova & Aronoff (2010), Rice (2011), Manova (submitted)
- According to the type of information used in affix ordering Manova & Aronoff (2010) define eight different approaches to affix order:
    1) phonological
    2) morphological
    3) syntactic
    4) semantic
    5) statistical
    6) psycholinguistic
    7) cognitive
    8) templatic

Word domains

(Manova 2010, 2011b, in press)



Affix ordering and word domains

- Inflection: **ABC**

  *pod-pis-**yv-a-t'***

- Evaluative suffixes: **AA**

  kartina 'picure' → DIM1 *kartin-**ka*** → DIM2 *kartin-**oč-ka***

- Non-evaluative derivation: **ABAB**

  lico 'face' → *lič-**n**-yj* 'personal' →

  → *lič-**n-ost'*** 'person, personality' →

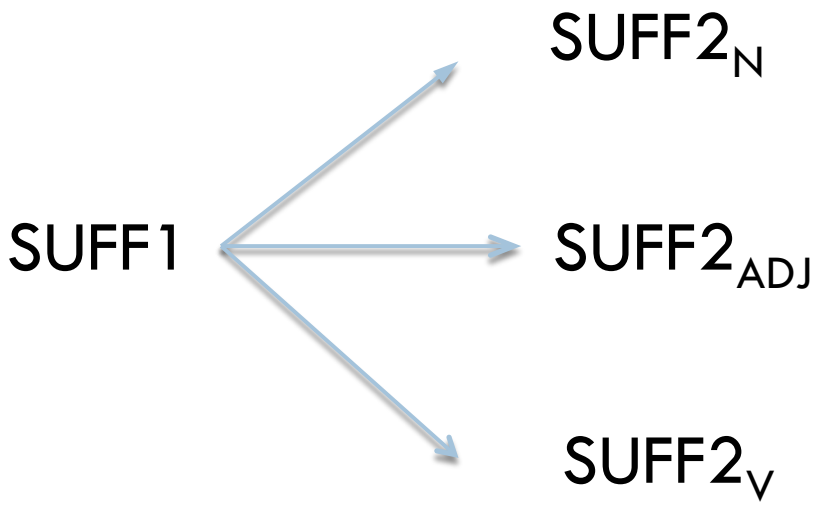
  → *lič-**n-ost-n**-yj* 'related to personality' →

  → *lič-**n-ost-n-ost'*** '(greater) personality'

Traditional analyses versus cognitive ordering

SUFF1 + all SUFF2 that follow it

versus



- Cf. Gauss-Jordan elimination (Manova 2011b)

Parts of speech 1

- The lexical-category specification of a suffix can be N, V and ADJ, and it is seen as cognitively defined in terms of semantic concepts
- Langacker's (1987) - conceptual analysis of parts of speech
- Croft (2001) – universal-typological theory of parts of speech

Parts of speech 2

- Langacker (1987), based on ***relationality*** (i.e. +/- relational) and ***way of scanning*** (whether summarily scanned, i.e. conceived statistically and holistically, or sequentially scanned, i.e. mentally scanned through time), recognizes ***things*** (N), ***processes*** (V) and ***modifiers*** (ADJ).
- Croft (2001) defines objects, properties and actions in terms of four semantic properties: ***relationality, stativity, transitoriness*** and ***gradability***. Thus prototypically, nouns name things or objects, verbs denote processes or actions, and adjectives are modifiers and express properties.

Parts of speech 3

- Nouns, adjectives and verbs behave differently in grammar
- Children acquire nouns and verbs differently: Germanic, Romance and Slavic nouns are acquired faster.
  - Research on child language carried out in Vienna (Dressler's lab)
- Nouns and verbs activate different parts of the brain
  - Mestres-Missé et al. (2010), among many others

English -ist: A traditional analysis

SUFF1	Lexical category of SUFF1	Followed by SUFF2
-ist	N	*-dom, -ic, -y, -ize*

Data from Aronoff & Fuhrhop (2002), based on OED, CD 1994

English -ist: A cognitive analysis

SUFF1	Lexical category of SUFF1	SUFF2	SUFF2 suffixes of the same lexical category in numbers
-ist	N	N: *-dom* (2) ADJ: ***-ic* (631)**, *-y* (5) V: *-ize* (3)	N: **1** ***ADJ: 2*** V: **1**

Table from Manova (2011b)
Data from Aronoff & Fuhrhop (2002), based on OED, CD 1994

Types of SUFF1-SUFF2 combination

- ***Fixed (unique)*** (most suffix combinations in a language are of this type)
  - SUFF1 combines with only one particular SUFF2 of a major lexical category, N, V, ADJ

-ist: Fixed (unique combinations)

SUFF1	Syntactic category of SUFF1	SUFF2	SUFF2 suffixes with the same word-class in numbers
-ist	N	N: *-dom* (2) ADJ: ***-ic* (631)**, *-y* (5) V: *-ize* (3)	N: **1** ***ADJ: 2*** V: **1**

Table from Manova (2011b)
Data from Aronoff & Fuhrhop (2002)

Types of SUFF1-SUFF2 combination

- ***Fixed (unique)*** (most suffix combinations in a language are of this type)
  - SUFF1 combines with only one particular SUFF2 of a major lexical category, N, V, ADJ
- ***Predictable***
  - SUFF2 applies by default – the majority of words (types) are derived by this suffix
  - SUFF2 is semantically determined (based on intentional semantics)

-ist: Predictable combinations

SUFF1	Syntactic category of SUFF1	SUFF2	SUFF2 suffixes with the same word-class in numbers
-ist	N	N: *-dom* (2) ADJ: ***-ic* (631)**, *-y* (5) V: *-ize* (3)	N: **1** ***ADJ: 2*** V: **1**

Table from Manova (2011b)
Data from Aronoff & Fuhrhop (2002)

>10 types or ≤10 types

SUFF1 → $SUFF2_X$, $SUFF2_X$, ...

- A default SUFF2 derives >10 types
- SUFF1-SUFF2 combinations that occur in ≤10 types should be rote-learned (e.g. *tour-ist-y, fasc-ist-ize*)
- SUFF1-SUFF2 combinations that derive ≤ 10 types are listed together with the bases they attach to, i.e. in constructions of words of Booij's (2010) type.
- Thus, SUFF1-SUFF2 combinations that derive ≤ 10 types neither validate nor invalidate the existence of two-suffix constructions

Types of SUFF1-SUFF2 combination

- ***Fixed (unique)*** (most suffix combinations in a language are of this type)
  - SUFF1 combines with only one particular SUFF2 of a major lexical category, N, V, ADJ
- ***Predictable***
  - SUFF2 applies by default – the majority of words (types) are derived by this suffix
  - SUFF2 is semantically determined (based on intentional semantics)
- ***Unpredictable***
  - very few combinations are of this type

Suffix combinations in Italian: Data

- **derIvaTario**

DERIVATARIO is a lexicon of over 11,000 Italian derivatives developed at Scuola Normale Superiore, Pisa. Its features include: morphological segmentation of derivatives, information on stem and affix allomorphy, morphotactic and morphosemantic analysis for each word-formation process.

DERIVATARIO is based on *CoLFIS*, a 4 million token corpus developed in the mid-nineties (Bertinetto et al. 2005). Being established on the most read Italian newspapers, books and journals, CoLFIS aims to **represent the language perceived by the average Italian reader.**

- **la Repubblica** corpus is a very large corpus (approximately 380M tokens)
  - "la Repubblica" contains texts of Italian newspapers. It is tokenized, pos-tagged, lemmatized and categorized in terms of genre and topic. There is no annotation for derivational morphology.
- Internet

Suffix combinations in Italian (derIvaTario)

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	-iere	N pers	N: -ismo A: -istico	giustizierismo 'avengerism' infermieristico 'nursing'
2.	-bile	A qualit	N:- ità V: -izzare	durabilità 'durability' stabilizzare 'stabilize'
3.	-ico	A rel	N: ità (>10), -ismo (2) A: -oso V: -izzare	classicità 'classic time' profetismo 'prophetism' bellicoso 'belicose' sintetizzare 'synthetize'
4.	-ale	A rel	N: -ità (abstract n), -ista (persons) V: -izzare	vitalità 'vitality' ambientalista 'environmentalist' personalizzare 'personalize'

Fixed (unique) combinations (derIvaTario)

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	-iere	N pers	N: -ismo A: -istico	giustizierismo 'avengerism' infermieristico 'nursing'
2.	-bile	A qualit	N:- ità V: -izzare	durabilità 'durability' stabilizzare 'stabilize'
3.	-ico	A rel	N: ità (>10), -ismo (2) A: -oso V: -izzare	classicità 'classic time' profetismo 'prophetism' bellicoso 'belicose' sintetizzare 'synthetize'
4.	-ale	A rel	N: -ità (abstract n), -ista (persons) V: -izzare	vitalità 'vitality' ambientalista 'environmentalist' personalizzare 'personalize'

Combination by default (derIvaTario)

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	-iere	N pers	N: -ismo A: -istico	giustizierismo 'avengerism' infermieristico 'nursing'
2.	-bile	A qualit	N:- ità V: -izzare	durabilità 'durability' stabilizzare 'stabilize'
3.	-ico	A rel	N: -ità (>10), -ismo (2) A: -oso V: -izzare	classicità 'classic time' profetismo 'prophetism' bellicoso 'belicose' sintetizzare 'synthetize'
4.	-ale	A rel	N: -ità (abstract n), -ista (persons) V: -izzare	vitalità 'vitality' ambientalista 'environmentalist' personalizzare 'personalize'

Suffix-particular semantics

(N [+abstract] versus N [–abstract]) (derIvaTario)

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	-ismo	N abstr	Ø	
2.	-izzare	V caus	N: -mento (8), -zione (>1000), -tore (>150) A: -bile (>100), -torio (8)	volgarizzamento ' popularization americanizzazione 'americanization' potabilizzatore 'water purifier' utilizzabile 'usable' privatizzatorio 'privatizatory '
3.	-ese	A rel	N: -ità (2) -ismo (2) V: -izzare (1)	torinesità 'the essence of being Turinese' , francesismo 'gallicism' giapponeseria 'collection of japanese thing' francesizzare 'frenchify'

Suffix-particular combinability (closing suffixes) (the suffix -ismo)

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	-ismo	N abstr	Ø	
2.	-izzare	V caus	N: -mento (8), -zione (>1000), -tore (>150) A: -bile (>100), -torio (8)	volgarizzamento ' popularization americanizzazione 'americanization' potabilizzatore 'water purifier' utilizzabile 'usable' privatizzatorio 'privatizatory '
3.	-ese	A rel	N: -ità (2) -ismo (2) V: -izzare (1)	torinesità 'the essence of being Turinese' , francesismo 'gallicism' giapponeseria 'collection of japanese thing' francesizzare 'frenchify'

DerIvaTario versus La Repubblica

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	-ismo	N abstr	Ø	
2.	-izzare	V caus	N: -mento (8)**(4:rep)**, -zione (>1000) (default for abstr N) -tore (>150)(-abstr N) A: -bile (>100) (default) -torio (8) **(10:rep)**	volgarizzamento ' popularization americanizzazione 'americanization' potabilizzatore 'water purifier' utilizzabile 'usable' privatizzatorio 'privatizatory '
3.	-ese	A rel	N: -ità (2)**(24:rep)** (default for abstr N) -ismo (2)**(8:rep)**(closing) **-eria (6:rep)**(object) V: -izzare (1) **(>10:rep)**	torinesità 'the essence of being Turinese' , francesismo 'gallicism' giapponeseria 'collection of japanese thing' francesizzare 'frenchify'

Suffix combinations in Russian: Data

- **Morpheme dictionary** (Kuznetsova & Efremova 1986) 52,000 lexemes, lists of all roots, all prefixes and suffixes, as well as all morpheme combinations, i.e. combinations of prefixes, and prefixes and roots, as well as combinations of suffixes and suffixes and roots.
- **Russian National Corpus** – over 500M tokens, texts of different genres and styles, annotated for word-formation but it is still work in progress and thus unreliable.
- **Internet**

Suffix-particular semantics

(cf. semantics in Distributed morphology, Halle & Marantz 1993)

- Synonymous suffixes (examples from Russian)

No	SUFF1	SUFF1 Lexical category & semantics	SUFF2	Examples
1.	-tel'	N person	N: ***-stvo***, *-ščina* (2)[1] ADJ: ***-skij***	*učitel'stvo* '*being a teacher; teachers (coll.)*', *ljubitel'ščina* 'dilettantism', *učitel'skij* 'teacher's'
2.	-ač	N person	N: ***-estvo*** ADJ: ***-eskij***	*trubačestvo (Internet)* 'being a trumpeter; trumpeters (coll.)', *trubačeskij* 'trumpeter's'
3.	-un	N person	N: *-**stvo***, -ec ADJ: ***-skij***	*opekunstvo* 'being a guardian; guardianship', *brexunec* (= *brexun*) 'boaster', *opekunskij* 'guardian's'

[1]Number of types in the Russian National Corpus

Suffix-particular semantics

(cf. semantics in Distributed morphology, Halle & Marantz 1993)

- Synonymous suffixes (examples from Italian) (derIvaTario)

No	SUFF1	SUFF1 Lexical category & semantics	SUFF2	Examples
1.	-aio	N person	N: ***-ismo***	operaismo 'working class theory '
2.	-iere	N person	N: ***-ismo*** ADJ: -istico	giustizierismo 'avengerism' infermieristico 'nursing'
3.	-tore	N person	N: ***-ismo*** ADJ: *-ico* (1), *-ale* (>10)	conservatorismo 'conservatorism' pittorico 'pictorial', dittatoriale 'dictatorial'

Suffix-particular semantics

- Homophonous suffixes
  - Russian suffix *-tel'*

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	*-tel'*	N person	N: *-stvo, -ščina* (2)[1] ADJ: *-skij*	*učitel'stvo* 'being a teacher; teachers (coll.)', *ljubitel'ščina* 'dilettantism' *učitel'skij* 'teacher's'
2.	*-tel'*	N object	ADJ: *-nyj*	*ukazatel'nyj* 'indicatory'

[1]Number of types in the Russian National Corpus

Suffix-particular semantics

- Homophonous suffixes
  - Italian suffix *-tore'* (derIvaTario)

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	*-tore*	N person	N: *-ismo* (1) ADJ: *-ico* (1), *-ale* (>10)	conservatorismo 'conservatorism' pittorico 'pictorial', dittatoriale 'dictatorial'
2.	*-tore*	N object	Ø	

Two-suffix constructions

- Constructions may have holistic properties that cannot be reduced to properties of their individual constituents
  - ***-tel' +-nyj*** and ***-tel'nyj***

    1) [-tel' $_{N[-person]}$ -nyj$_A$]$_A$ (right-hand headedness)

    soedini-tel' 'connector' → *soedini-**tel'-nyj*** 'connecting'

    2) [V-tel'nyj$_A$]$_A$ (*V + -tel')

    vlijat' 'to influence' → *vlija-**tel'nyj*** 'influential' (**vlijatel'*)
  - ***-al'-nyj*** and ***-al'nyj***

    1) [-al$_{N[-person]}$- nyj$_A$]$_A$

    (*nač-at'*'to begin'→) *nač-alo* 'begin' – *nač-**al'-nyj*** 'beginning'

    2) [simplex$_{N[-person]}$-alnyj$_A$]$_A$

    monument 'monument' – *monument-**al'nyj*** 'monumental'

Suffixes and constructions

*nač-**al'-n-yj*** 'beginning', *monument-**al'n-yj*** 'monumental', *koneč-**n-yj*** 'final'

- right-hand headedness; semantic scope (Rice 2000)
- *-n-yj* and *-al'n-yj* are allomorphs (cf. Lieber 2005 for English)
- *-al-o, -al'n-yj, -n-yj* (specified for lexical and semantic category in the lexicon)

$[[\text{SUFF1}]_{Xi}\ \text{SUFF2}_{Yj}]_{Yk}$ ↔ 'semantics k, i.e. semantics i in the scope of j'

$[[\text{SUFF1}]_{Ni}\ \text{SUFF2}_{Aj}]_{Ak}$ ↔ 'semantics k, i.e. semantics i in the scope of j'

$[[\text{SUFF1}]_{N[\text{-person}]}\ \textit{-n-}_{A}]_{A}$ ↔ 'related to/having the quality of N'

$[[\text{simplex}]_{N[\text{-person}]}\ \textit{-al'n-}_{A}]_{A}$ ↔ 'related to/having the quality of N'

$[[\text{simplex}]_{N[\text{-person}]}\ \textit{-n-}_{A}]_{A}$ ↔ 'related to/having the quality of N'

Diachronic change

- Reanalysis of ***-al-en*** as ***-en*** due to diachronic change
  - Old Bulgarian

    nač-ėti 'to begin' → *nač-**élo*** 'begin'
  - Modern Bulgarian **načėti* *(započvam)* but *načalo*

    načalo '*begin*' → *načal-**en*** 'beginning'

(*ogledam* '*(I) mirror*') *ogeld-**alo*** 'mirror' → *ogled-**al-en*** 'mirror-'

monument 'monument' → *monument-**alen*** 'monumental'

Conclusions 1

- Affix ordering is best analyzed in terms of binary combinations of affixes, i.e. two-suffix constructions of the type SUFF1-SUFF2 in suffixation.
- If the lexical-category specification of a suffix and suffix-particular semantics are considered, most suffix combinations appear either fixed or predictable, i.e. most probably, speakers do not always produce suffix combinations as compositional pieces of structure (cf. entrenchment, double-route access, constructions).
- To understand the nature of suffix combinations, it is not (always) necessary to relate them to lexical bases.

Conclusions 2

- Fixed and predictable SUFF1-SUFF2 combinations, or two-suffix constructions, appear pieces of purely morphological structure with status of their own in the lexicon.
- Two-suffix constructions are structures between morphemes and words, i.e. the morphological parallel of phrases in syntax.
- The results of this research also suggest that suffixes should be specified in terms of cognitive (lexical and semantic) categories in the lexicon (cf. Lieber 2005).
- As a semantic category is defined through further suffixation (all suffixes for *persons* have the same (or similar) further suffixation), this research can provide a verifiable list of the semantic categories involved in affix ordering.

Conclusions 3

- This research can find a number of practical implementations:
  - The fact that most affix combinations are fixed and predictable can be used for ***improvement of speech recognition technologies***.
  - If SUFF1 combines with one $SUFF2_N$, $SUFF2_{ADJ}$ and $SUFF2_{V,}$ i.e. with up to three suffixes, that SUFF1 can be identified in an electronic corpus statistically – on the basis of its combinability. Thus, our results can be used for ***automatic annotation of corpora at the level of morpheme***.
  - The observations about fixed and predictable combinations as well as the importance of cognitive categories for the composition of the word can be easily implemented in ***foreign language teaching to facilitate vocabulary acquisition***.

Thank you!

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