

Processing Suffix Combinations in Slovene

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What this talk is about

- Most derived words can be further derived and the result is a new word with two (or more) derivational suffixes (SUFF1 and SUFF2 are any two neighboring derivational suffixes):

jezik-ov + -en → *jezikoven* ‘linguistic’ (-*ov* is SUFF1, -*en* is SUFF2)

**jezik-en-ov* (consists of the same morphemes but is not a word in Slovene)

- With this study we tried to find out **how native speakers of Slovene know which SUFF1-SUFF2 combinations are eligible** and which not
- Restrictions on affix combinability exist in all languages of the world:

Eng. *lead-er-ship* but not **lead-ship-er*

Outline of the talk

1. Theoretical background
 - a. Approaches to affix order
 - b. This study: A cognitive approach
2. A psycholinguistic experiment (to verify the followed approach)
3. Discussion of results and relevance for foreign language learning

Affix ordering

Affix ordering is a **major issue in linguistics**, there is much research on the topic and many theories (approaches) have been suggested to explain the way affixes combine in different languages, overviews in Manova & Aronoff (2010) and Rice (2011).

Approaches to affix ordering

- According to the **type of information used in affix ordering**, Manova & Aronoff (2010) differentiate eight different approaches:
 - 1) phonological
 - 2) morphological
 - 3) syntactic
 - 4) semantic
 - 5) statistical
 - 6) psycholinguistic
 - 7) cognitive
 - 8) templatic

Deriving a word

- In **morphological theory**, it is assumed that all derivations start from a lexical base (be it a root or a stem) to which then affixes are attached step by step, i.e. for suffixation:

BASE → BASE+SUFF1 → BASE+SUFF1+SUFF2, etc.

- All theories, irrespective of the type of morphemes they recognize (classical morphemes relate meaning and form, e.g. as in Minimalist Morphology; abstract morphemes correspond to terminal nodes in a syntactic tree, e.g. as in Distributed Morphology; morphemes have also been seen as markings that are semantically empty, e.g. as in Paradigm Function Morphology), agree that affixes without bases do not play any role in morphology.
- **Slovene sources** (Vidovič Muha 1988, 2011; Toporišič 2000, 2006, a.o.)

Derivational suffixes: A traditional analysis

SUFF2 selects SUFF1, i.e. from SUFF2 to SUFF, 1as demonstrated in this table:

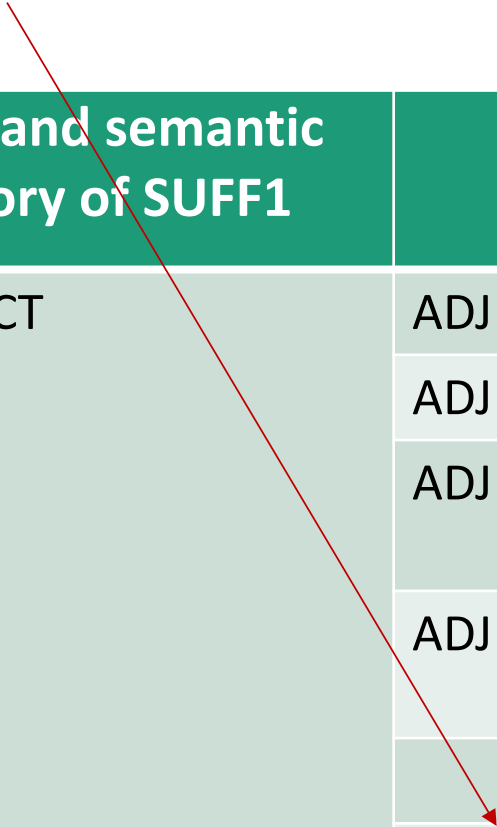
SUFF2	SUFF1	Example
<i>-en</i> _{ADJ}	<i>-ost</i> _N (abstract nouns)	<i>mlad-ost-en</i> ‘youthful’
<i>-ljiv</i> _{ADJ}		<i>mil-ost-ljiv</i> ‘merciful’
<i>-ojen</i> _{ADJ}		<i>sam-ost-ojen</i> ‘independent’
<i>-alnen</i> _{ADJ}		<i>sam-ost-alen</i> ‘independent’
<i>-nik</i> _N		<i>mlad-ost-nik</i> ‘adolescent’

Our analysis

SUFF1	Lexical and semantic category of SUFF1	SUFF2	Example
-ost	N ABSTRACT	ADJ: -en (> 10)	<i>mlad-ost-en</i> 'youthful'
		ADJ: -ljiv (1)	<i>mil-ost-ljiv</i> 'merciful'
		ADJ: -ojen (1)	<i>sam-ost-ojen</i> 'independent'
		ADJ: -alen (1)	<i>sam-ost-alen</i> 'independent'
		N: -nik (7)	<i>mlad-ost-nik</i> 'adolescent'

Fixed combination

SUFF1	Lexical and semantic category of SUFF1	SUFF2	Example
-ost	N ABSTRACT	ADJ: -en (> 10)	<i>mlad-ost-en</i> 'youthful'
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		ADJ: -ojen (1)	<i>sam-ost-ojen</i> 'independent'
		ADJ: -alen (1)	<i>sam-ost-alen</i> 'independent'
		N: -nik (7)	<i>mlad-ost-nik</i> 'adolescent'



Predictable combinations

SUFF1	Lexical and semantic category of SUFF1	SUFF2	Example	
-ost	N ABSTRACT	ADJ: <i>-en</i> (> 10)	<i>mlad-ost-en</i> 'youthful'	
		ADJ: <i>-ljiv</i> (1)	<i>mil-ost-ljiv</i> 'merciful'	
		ADJ: <i>-ojen</i> (1)	<i>sam-ost-ojen</i> 'independent'	
		ADJ: <i>-alen</i> (1)	<i>sam-ost-alen</i> 'independent'	
		N: <i>-nik</i> (7)	<i>mlad-ost-nik</i> 'adolescent'	

Fixed and predictable combinations

- The idea of fixed and predictable combinations of derivational suffixes has been tested against large sets of data from Bulgarian, Russian, Polish, English and Italian (Manova 2011, 2015; Bagasheva and Manova 2013; Manova and Talamo 2015)
- This presentation reports on an experiment that used data from Slovene
- The experiment is an adapted-to-Slovene replication of Manova and Brzoza (ms) that is on the processing of derivational suffix combinations in Polish

Productive combination

SUFF1	Lexical and semantic category of SUFF1	SUFF2	Example
-ost	N ABSTRACT	ADJ: <i>-en</i> (> 10)	<i>mlad-ost-en</i> 'youthful'
		ADJ: <i>-ljiv</i> (1)	<i>mil-ost-ljiv</i> 'merciful'
		ADJ: <i>-ojen</i> (1)	<i>sam-ost-ojen</i> 'independent'
		ADJ: <i>-alnik</i> (1)	<i>sam-ost-alen</i> 'independent'
		N: <i>-nik</i> (7)	<i>mlad-ost-nik</i> 'adolescent'

Suffix productivity was determined based on type-frequency, the frequencies were counted in the *Slovar slovenskega knjižnega jezika*, s. <http://www.fran.si/130/sskj-slovar-slovenskega-knjiznegajezika>.

Hypotheses

H1: If SUFF1 tends to combine with only one SUFF2 of a major lexical category (N, ADJ, V), SUFF1-SUFF2 combinations are unique pieces of structure and speakers should know them by heart, i.e. native speakers should have intrinsic knowledge of whether a letter sequence exists in their native language as a derivational suffix combination or not.

H2: If native speakers know suffix combinations by heart, productive combinations should be recognized with higher accuracy than unproductive ones, i.e. unproductive suffix combinations should be learned and recognized based on whole words, while productive suffix combinations should be learned and recognized as suffix combinations.

Experiment (I)

• Subjects

- 32 native speakers of Slovene
- Age: $M = 37.06$, $SD = 14.72$
- All but one right-handed
- No history of developmental dyslexia or reading disabilities
- Normal or corrected to normal vision
- All speak Slovene as their L1 and dominant language
- All speak at least one foreign language ($M = 2.31$, $SD = 1.15$)
- Education level: 12 high-school diploma; 8 bachelor's degree; 9 master's degree; 3 PhD)
- Voluntary participation

14   18

Experiment (II)

- **Materials**

- 60 suffix combinations
 - 30 existing combinations
 - 15 **productive**
 - 15 **unproductive**
 - 30 non-existing combinations
 - 15 created by **permutation** (-*skinja* from -*injski* as in *gospodinjski* 'of household')
 - 15 created by **manipulation of letters** (-*arsti* from -*arski* as in *čebelarski* 'apicultural')
- 2 lists
 - each with the suffixes of the other in reverse order
 - each participant saw all combinations
- **Identification task** (i.e. similar to the lexical decision task but involving recognition of pieces of words instead of whole words)
- Maximum **time for decision**: 10 minutes
- The testing took place in a controlled and quiet setting

Questionnaire (sample)

	Obstaja	Ne obstaja
ilen		
ostški		
ovanje		
ifikarija		
ostnjiv		
avnik		
ekič		
skilec		
ovina		

Results (I)

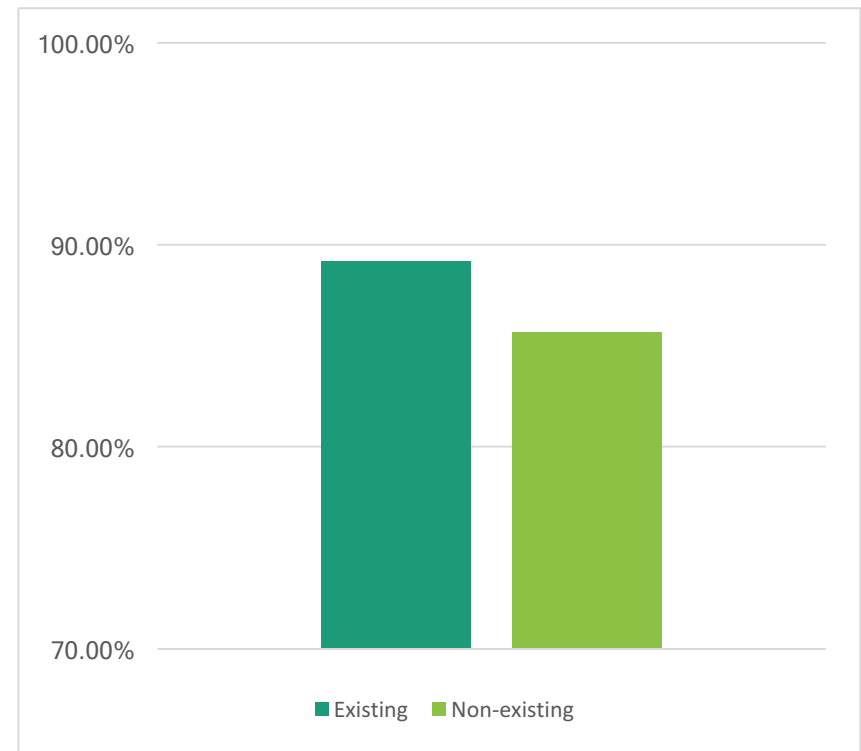
Existing vs. non-existing combinations

Existing: 89.17%

Non-existing: 85.67%

$t(29) = -0.99, p = 0.33$

Good intuition!



Results (II)

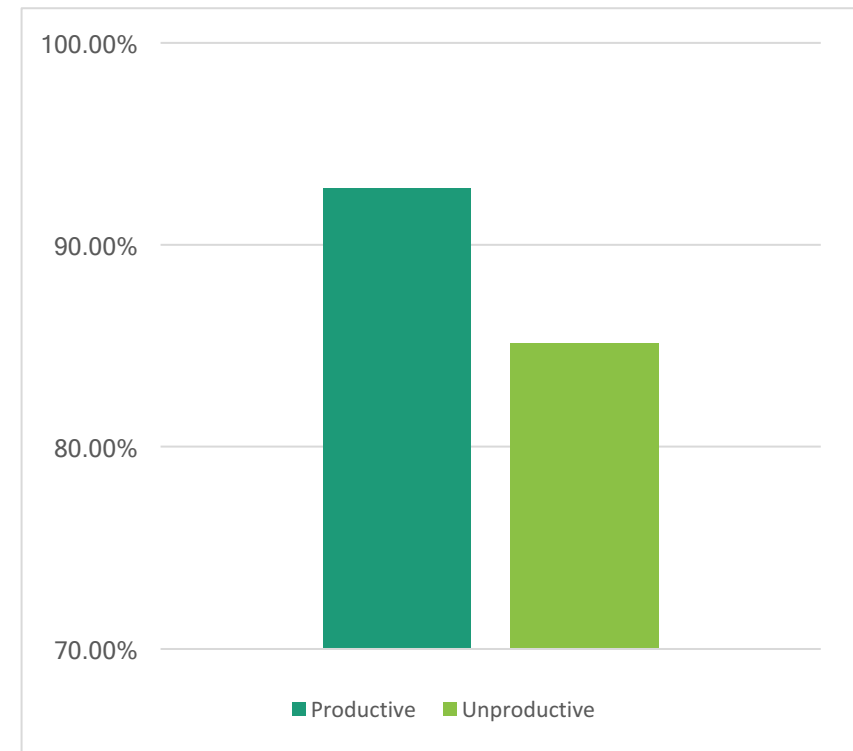
Productive vs. unproductive combinations

Productive: 92.67%

Unproductive: 85.13%

$t(29) = 8.16, p < 0.01$

The difference is statistically significant.



Conclusions

The results of the experiment confirmed our hypotheses:

- Native speakers have a very good intuition whether a sequence of letters is an eligible derivational suffix combination in their language or not
- The accuracy of recognition of the productive combinations was significantly higher than that of the unproductive ones, i.e. productive and unproductive suffix combinations seem to be processed differently:
 - Productive suffix combinations seem to be rote-learned
 - Unproductive combinations seem to be learned in whole words
- Implications for foreign language learning
 - Encourage your students to learn not only whole words but also productive affix combinations because this seems to be the secret of the native speaker language competence in morphological processing

Thank you!

Selected references

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