Suffix combinations in the mental lexicon

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Scope

- Our research is on suffix combinability or suffix ordering, i.e. we investigate structures of the type BASE+SUFF1+SUFF2 and try to answer the question why it is *lead-er-ship* and not **lead-ship-er* or *strzel-ec-two* 'shooting' and not **strzel-two-ec*
- Restrictions on affix ordering exist in all languages of the world

Structure of the talk

1. Theoretical background
   a. Approaches to affix order
   b. This study: Cognitive approach
2. Phycholinguistic experiments (to verify the followed approach)
3. Discussion of results, their relevance and future directions

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 order

- 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

English -ist: A traditional analysis

SUFF1	Word class 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	Syntactic category of SUFF1	SUFF2
-ist	N	N: *-dom* (2) ADJ: ***-ic* (631)**, *-y* (5) V: *-ize* (3)

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

Nouns, adjectives and verbs are seen as being cognitive in nature. (cf. Langacker 1987)

-ist: Fixed combinations

SUFF1	Syntactic category of SUFF1	SUFF2
-ist	N	N: *-dom* (2) ADJ: ***-ic* (631)**, *-y* (5) V: *-ize* (3)

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

-ist: Predictable combinations

SUFF1	Syntactic category of SUFF1	SUFF2
-ist	N	N: *-dom* (2) ADJ: ***-ic* (631)**, *-y* (5) V: *-ize* (3)

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

Example from Polish

SUFF1	Word class of SUFF1	Syntactic category of SUFF1	Examples	Translations
-ak	N	N: *-two*, *-ówka* (1)	*pływ-ac-two* *śpiew-ac-two* *ryb-acz-ówka*	swimming singers fisher's house
		ADJ: *-ki*, *-owaty* (3), *-ny* (3)	*pływ-ac-ki* *prost-ak-owaty* *cud-acz-ny*	swimmer- boorish Peculiar
		V: *-nieć*	*cud-acz-nieć*	to become strange

- 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 experiments that used data from Polish.

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.

H2: If speakers know suffix combinations by heart, existing combinations should be recognised with higher accuracy and faster than non-existing ones.

EXPERIMENTS

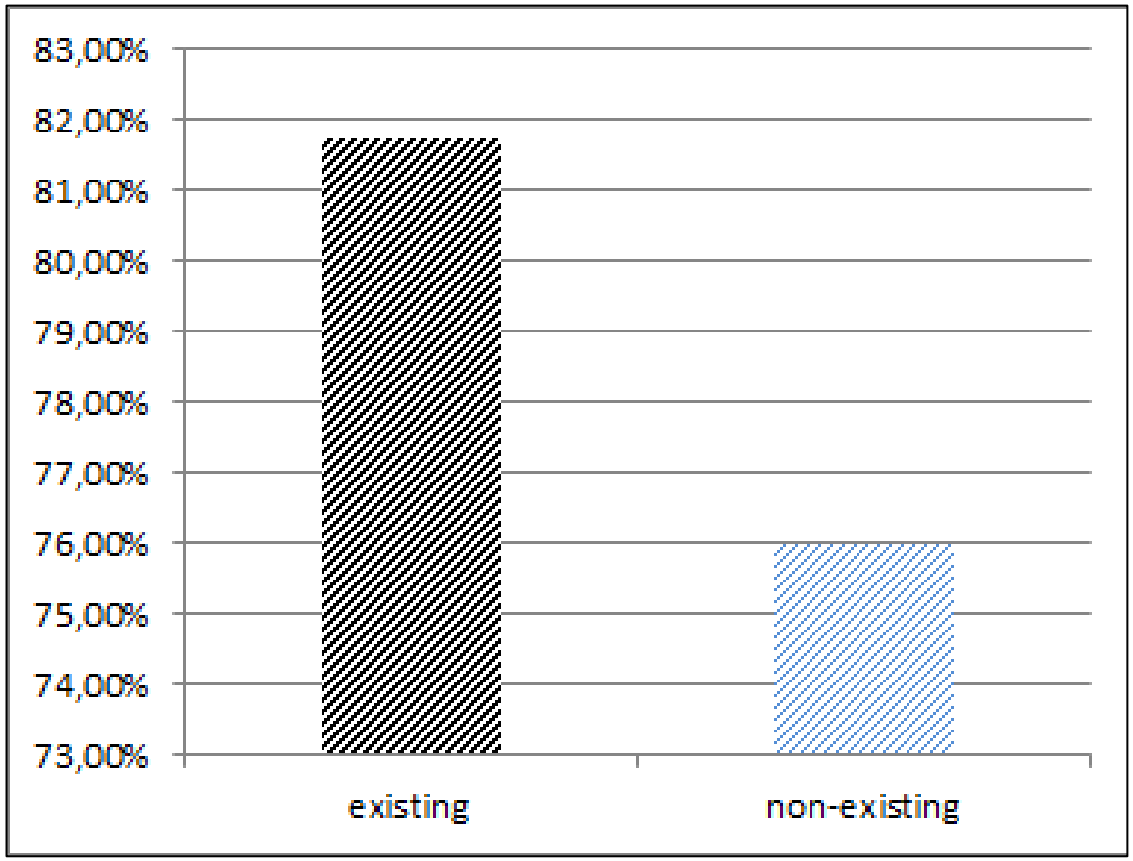
Experiment 1: Description

- 64 native speakers of Polish
- age: M=23.2 yo (SD=1.76)

- no history of developmental dyslexia or reading disabilities, non-linguists
- 60 items
  - 30 existing suffix combinations from Polish, e.g. ***-ar-nia*** as in *kawi**-ar-nia*** ‘*café*’;
  - 30 non-existing suffix combinations from Polish created by changing the order of the suffixes of the legal ones or by manipulating phonemes, e.g. from the existing ***-ar-nia*** → ***-ni-ar*** *or* ***–ur-nia***
- 2 lists
  - each with the suffixes of the other in reverse order
  - each participant saw all combinations

- task: decide as quickly and as accurately as possible if a combination exists or not
- training: a few examples of derivations of existing and non-existing words with two suffixes in Polish to ensure that the participant understands the task.
- participants received a list of existing and non-existing suffix combinations and had to complete the task.
- maximum time for decision: 10 minutes

Results of experiment 1: Accuracy



Acc. for existing:
M=81.72% (SD=0.29)

Acc. for non-existing:
M=75.99% (SD=0.22)

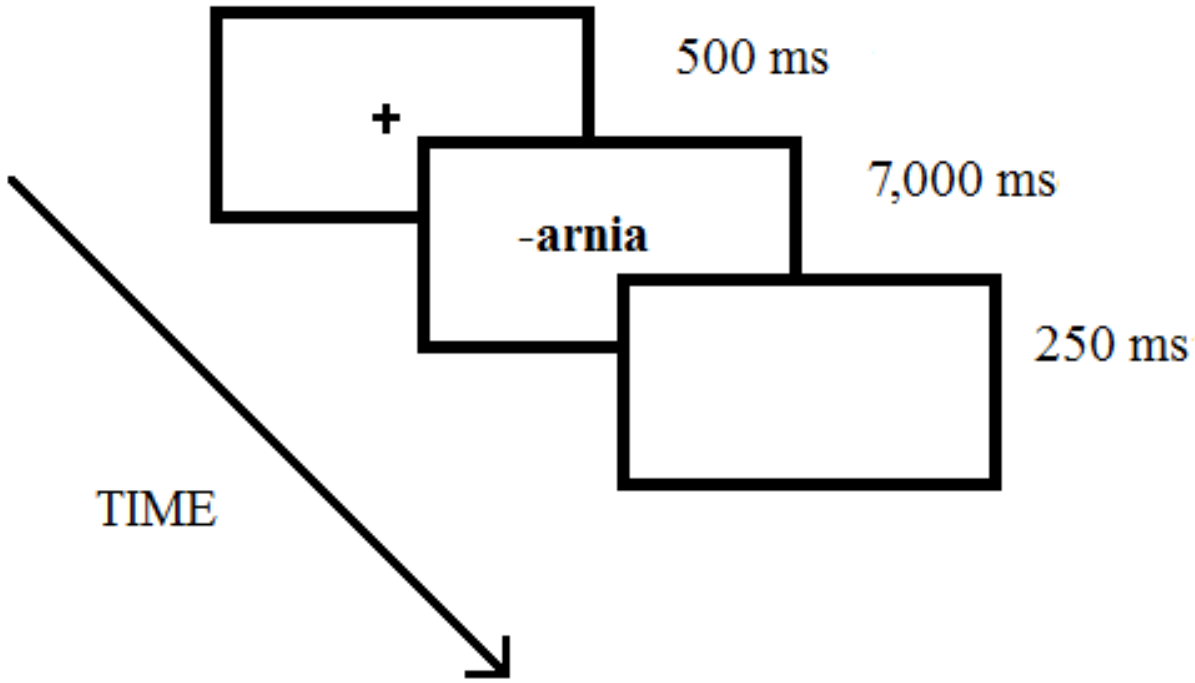
$t(63)=2.34$;

$p=0.02$

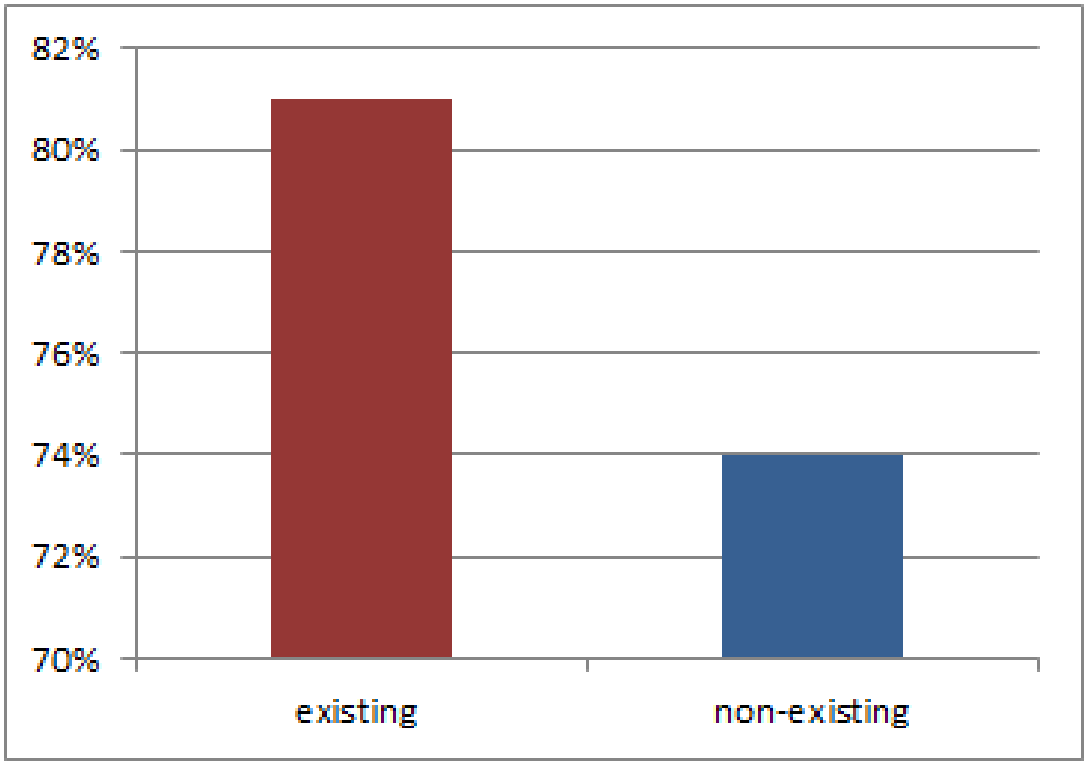
Experiment 2: Description

- Participants: 53 subjects, age: M=21.43; SD=1.83
- Task: Press the right arrow button if a string of letters is an existing combination or the left CTRL button if it is not. In case of a doubt, behave as if a stimulus does not exist.
- Materials: 44 existing and 44 non-existing suffix combinations organized in 2 lists
- Each participant saw all combinations.

Experiment 2: Procedure



Experiment 2: Results – Accuracy

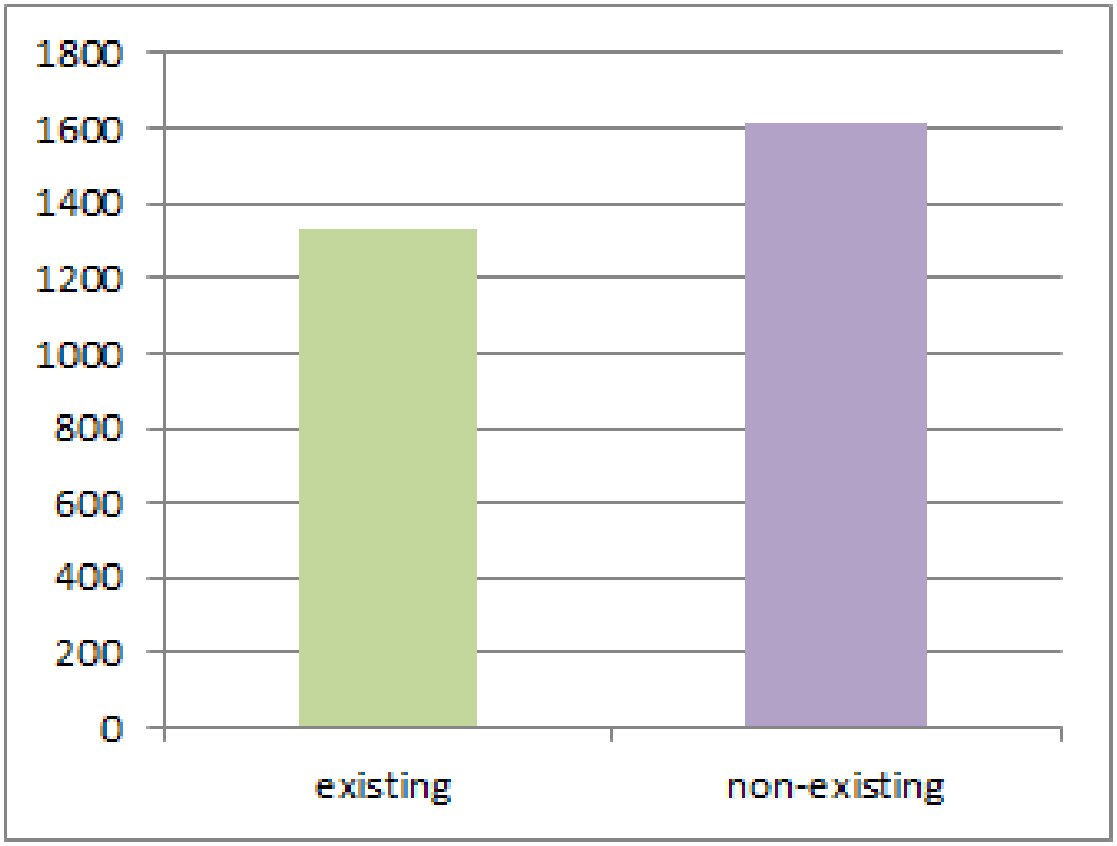


Existing combinations:
M_{ACC}= 81%, SD=.09

Non-existing combinations:
M_{ACC}= 74%, SD=.12

t(52)=3.03; *p*=0.004

Experiment 2: Results – RTs



Existing combinations:
M_{RT}=1333.14;
SD=420.57

Non-existing combinations:
M_{RT}=1610.38;
SD=556.02

t(51)=-7.53; *p*<0.001

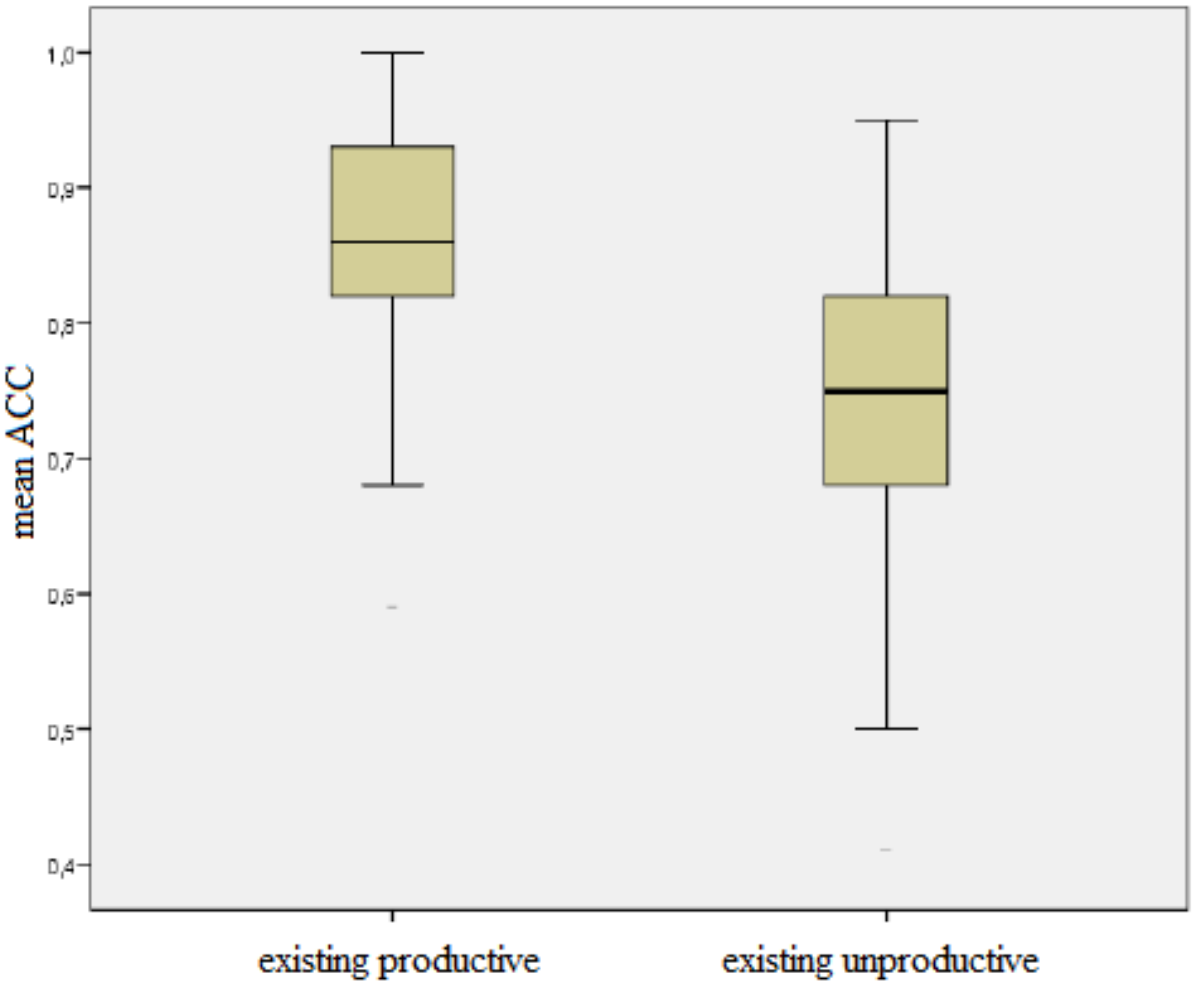
Discussion of results

- **Experiment 2 confirms the result of experiment 1**

- Accuracy for existing combinations higher than for non-existing, reaction times to existing combinations shorter than to non-existing
- Recognition of suffix combinations seems to resemble recognition of words, cf. word superiority effect
- If suffix combinations are represented in the mental lexicon, why is the accuracy of the existing combinations not (close to)100%?
  - existing combinations with low accuracy, e.g., ***-acz-ostwo*** as in *smark-acz-ostwo 'bratness'* (derived from *smarkacz* 'brat') are unproductive and infrequent

- **Suffix combinations are most probably stored in the mental lexicon**

Productivity and accuracy (exp.2)

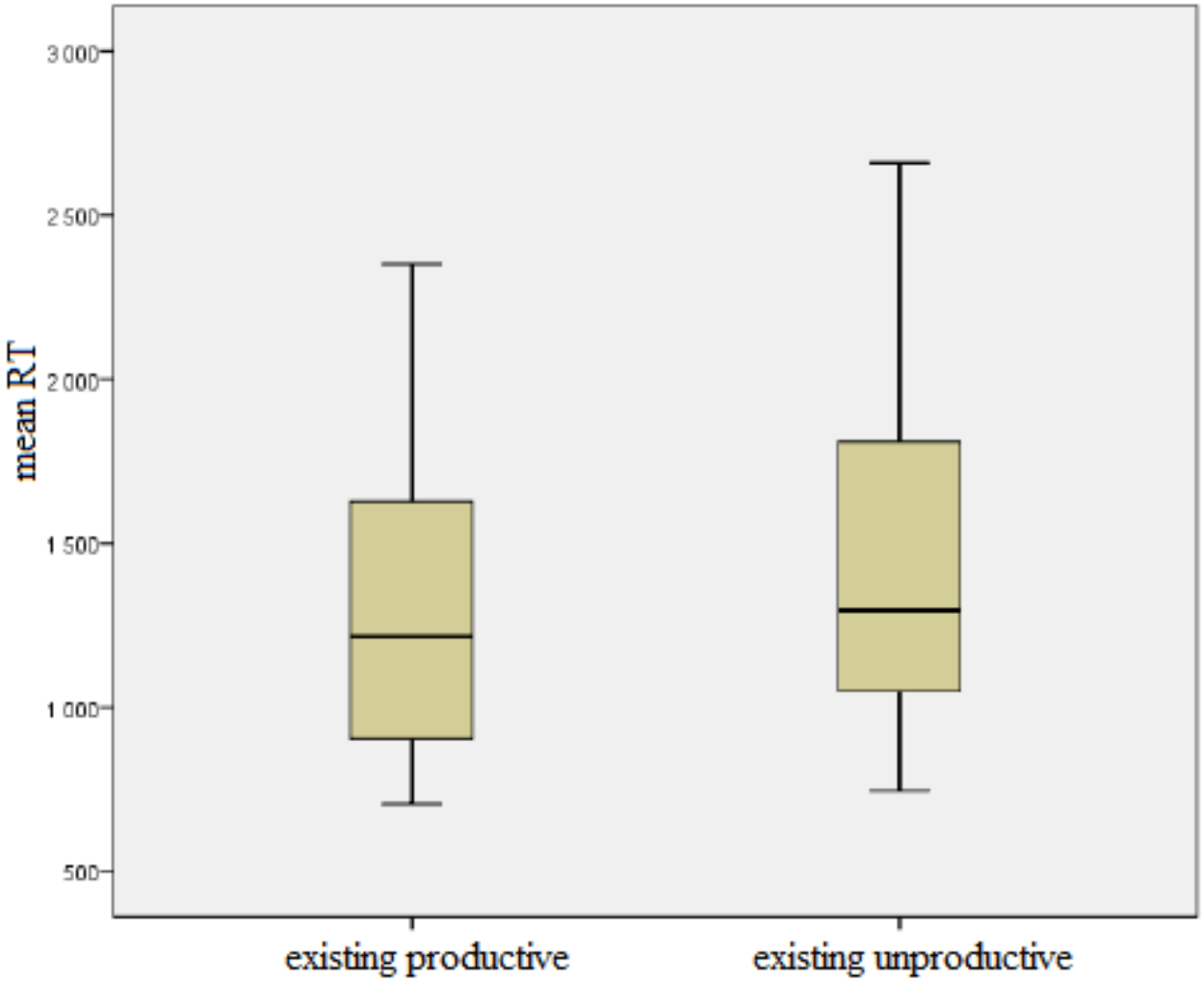


Productive combinations:
M_{ACC}= 86%, SD=.09

Unproductive combinations:
M_{ACC}= 75%, SD=.11

t(51)=7.81; *p*<0.001

Productivity and RTs (exp.2)



Productive combinations:
M_{RT}= 1288.44, SD=429.14

Unproductive combinations:
M_{RT}= 1421.01, SD=488.41

t(51)=-4.08; *p*<0.001

Further research

- investigating the processing of L2 suffix combinations with L2 learners of Polish to see whether the L2 learners produce and process word structure in the way native speakers do
- testing the processing of existing and non-existing suffix combinations in words with existing and non-existing bases (stems)

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THANK
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