Morphological processing across the lifespan: Evidence from number-dominant nouns

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Background

- Models of **access to multi-morphemic words**:
  - Full listing (Butterworth, 1983): apples
  - Full decomposition (Taft, Foster, 1975): apples
  - Dual-route (Shreuder, Baayen, 1995): apples + apples

- Access mechanisms may be modulated by linguistic characteristics
  - Frequency, morphological regularity, etc.

- Are access mechanisms also modulated by **speaker characteristics**?
  - Reifegerste et al., 2017:

Older age

↓

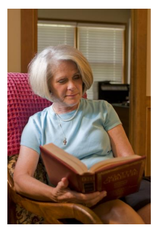
Greater exposure to language

↓

Word form representations strengthened

↓

Greater reliance on listing rather than decomposition



  - Their experiment:
  - Older speakers indeed more reliant on storage in German, but not in Dutch
  - Due to greater morphological complexity of German?

Research question

- Does reliance on **storage, rather than decomposition**, of multi-morphemic words increase with age?

Age ↑ apples → apples

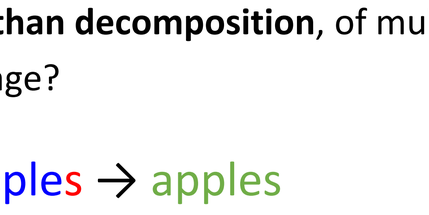
- Replication of Reifegerste et al., 2017, but this is new:
  - Russian: even more morphologically complex than German
  - Three age groups: adolescents, besides younger and older adults
  - Two morphological types of plural formation

Method

Participants

- Adolescents: n=19, age: mean 12.4, range 9-14 y. o.
- Younger adults: n=40, age: mean 21.4, range 17-29
- Older adults: n=37, age: mean 68.0, range 59-87

Task: Lexical decision



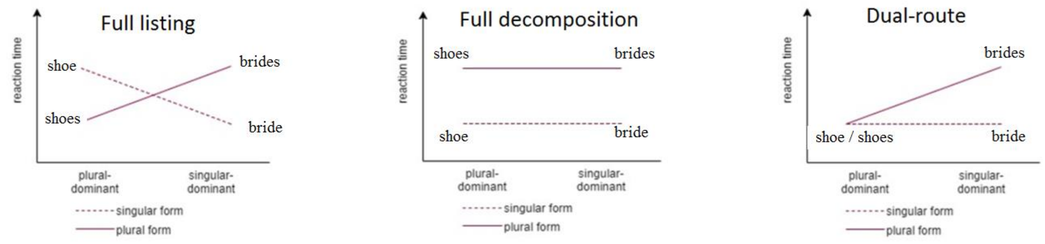
Stimuli

- 112 Russian nouns:
  - Number dominance:
    Singular-dominant (*soup, bride, throat*) vs. plural-dominant (*eye, shoe, tear*)
  - Morphological type of plural formation
    Addition (Sg. *glaz* - Pl. *glaza*; Sg. *okean* - Pl. *okeany*)
    vs. Replacement (Sg. *mama* - Pl. *mamy*; Sg. *ruka* - Pl. *ruki*)
  - Groups balanced for length in letters and syllables, log frequency, imageability, grammatical gender, declension type

- Two experimental lists, including each noun in singular and plural form
- 56 fillers (adjectives, adverbs), 168 pronounceable pseudowords
- Repeated-measures ANOVA in SPSS

Method

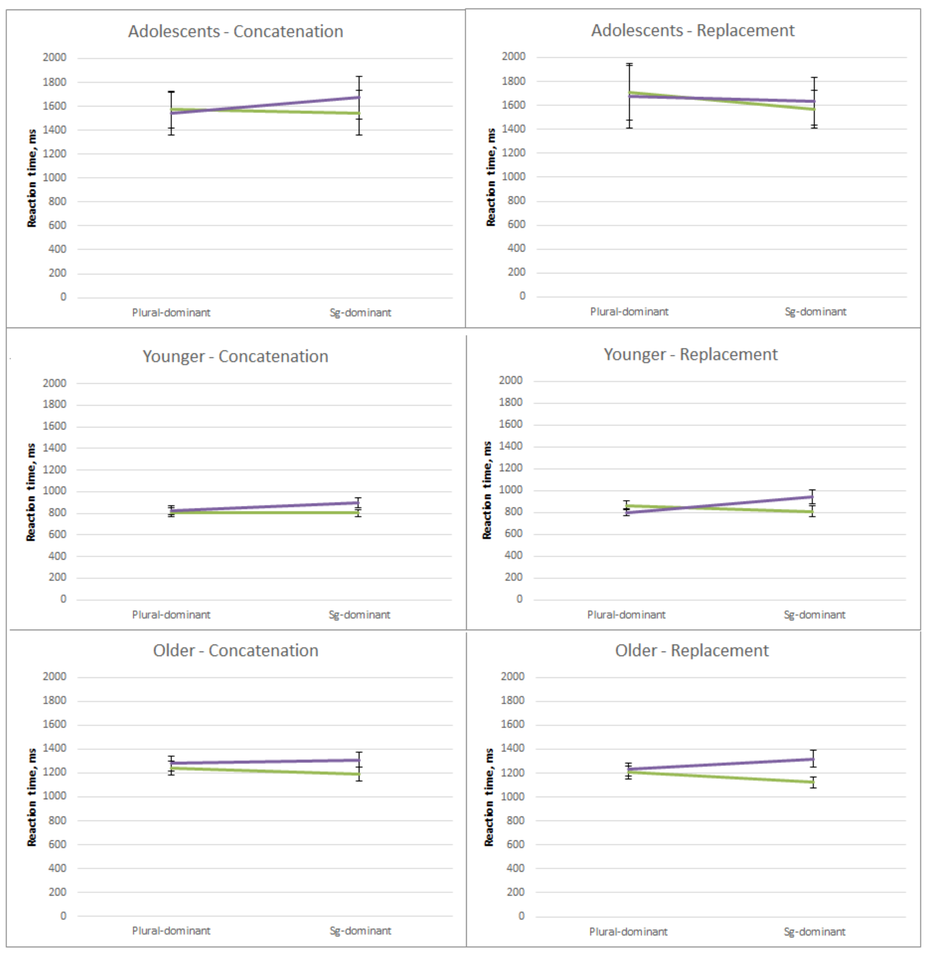
- Predictions of morphological processing models (adopted from Reifegerste et al., 2017)



Results

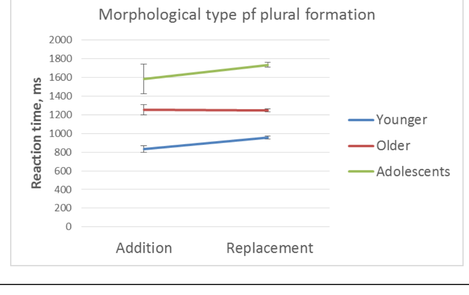
- High accuracy:
  Younger: mean 99%, range 94-100%; Older: mean 99%, range 96-100%;
  Adolescents: mean 94%, range 97-100%

- Reaction times: Singular form Plural form



	df	*F*	*P-value*
NumberDominance	1,93	,062	,804
MorphType	1,93	,793	,376
Form	**1,93**	**12,914**	**,001**
NumberDominance * Form	**1,93**	**11,793**	**,001**
MorphType * Form	1,93	,061	,806
NumberDominance * MorphType	1,93	1,403	,239
NumberDominance * MorphType * Form	1,93	,364	,548
Age	**2,93**	**23.436**	**<.001**
Age * NumberDominance	2,93	,743	,478
Age * MorphType	2,93	2,533	,085
Age * Form	2,93	1,477	,234
Age * NumberDominance * MorphType	2,93	1,861	,161
Age * NumberDominance * Form	2,93	,015	,985
Age * MorphType * Form	2,93	,448	,641
Age * NumberDominance * MorphType * Form	2,93	,311	,733

- Non-significant
  Age * MorphType trend:



Discussion

- Results most consistent with **dual-route models** across age groups
  - No evidence of an age-related shift from decomposition to storage
  - Russian is a morphologically complex language, but our results replicate the findings of Reifegerste et al. (2017) for Dutch, rather than for more morphologically complex German
- Lower performance and higher variability in **adolescents** than adults
- Unhypothesized trend for an interaction between **age and plural formation type**:
  - Replacement slower in younger adults and adolescents, but not in older adults

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