The Role of Gender in the Acquisition of the Serbian Case System

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	Case	Class I	Class II	Class III
Singular	Nominative	-ø/-o/-e	-a	-ø
	Genitive	-a	-e	-i
	Dative	-u	-i	-i
	Accusative	-ø/-o/-e // -a	-u	-ø
	Locative	-u	-i	-i
	Instrumental	-om/-em	-om	-ju/-i
	Vocative	-e/-u	-o	-i
Plural	Nominative	-i	-e	-i
	Genitive	-a	-a	-i
	Dative	-ima	-ima	-ima
	Accusative	-e	-e	-i
	Locative	-ima	-ama	-ima
	Instrumental	-ima	-ama	-ima
	Vocative	-i	-e	-i

Brown & Alt (2004)
Weisser (2006)

√CAT

-a

√DOG

-u

√DOLL

-e

-i

√CHAIR

-om

Marquis & Shi (2015)
Kovačević et al (2009)

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	Vocative	-e/-u	-o	-i
Plural	Nominative	-i	-e	-i
	Genitive	-a	-a	-i
	Dative	-ima	-ima	-ima
	Accusative	-e	-e	-i
	Locative	-ima	-ama	-ima
	Instrumental	-ima	-ama	-ima
	Vocative	-i	-e	-i

Brown & Alt (2004)
Weisser (2006)

We propose the use of gender

- Externally motivated and salient
- Clear categorization of nouns

- We hypothesize that
  - they are productively correlated with noun classes
  - And that children utilize this correlation in their acquisition

We use the TP to test this

The Tolerance Principle quantifies the number of exceptions a productive rule can tolerate before its formation becomes computationally inefficient.

Let R be a rule that is applicable to N items, of which e are exceptions. R is productive if and only iff (Yang 2016):

$$e \leq \theta_N \text{ where } \theta_N := \frac{N}{\ln N}$$

Yang (2006)
Schuler et al. (2016)
Kostić (1999)

1. Is gender a productive indicator of nominative singular suffixes?

TP applied with following parameters:

- N = number of nouns with a specific gender
- N – e = number of N nouns that have a given nom. sg. suffix, i.e. follow the rule
- e = number of N nouns that have another nom. sg. suffix, i.e. don't follow the rule

gender	N	θ_n	suffix	N-e	e	Productive?
feminine	121	25	-a	110	10	yes
masculine	112	23	-C	107	5	yes
neuter	38	10	-o	22	16	no
			-e	16	22	no
Neuter	38	10	-o/-e	38	0	yes

Gender is a productive indicator of noun class.

2. Are nominative singular suffixes productive indicators of gender?

- TP applied with following parameters:
- N = number of nouns taking on a specific nominative singular ending
- N – e = Number of N nouns that take on a specific gender, i.e. follow the rule
- e = number of N nouns that take on another gender, i.e. don't follow the rule

Nom. Sg. suffix	**N**	**θ_n**	**gender**	**N-e**	**e**	**Productive?**
-a	110	23	fem	110	0	Yes
			masc	0	110	No
			neut	0	110	no
-C	117	24	fem	9	108	no
			masc	107	10	yes
			neut	0	117	no
-o	28	8	fem	0	28	No
			masc	5	23	No
			neut	22	5	yes
-e	16	5	Fem	0	16	No
			Masc	0	16	No
			neut	16	0	yes

Nominative singular ending is a productive indicator of gender.

3. Is belonging to a specific noun class a productive indicator of gender?

- TP applied with following parameters:
- N = number of nouns belonging to a single noun class
- N – e = number of N nouns that have a specific gender, i.e. follow the rule
- e = number of N nouns that have a different gender, i.e. don't follow the rule

Class	**N**	**θ_n**	**gender**	**N - e**	**e**	**Productive ?**
Class I	150	29	Fem	0	150	no
			Masc	112	38	No
			Neut	38	112	No
			Not fem	150	0	yes
Class II	111	23	Fem	112*	0	yes
			masc	0	112	No
			Neut	0	112	no
Class III	10	4	Fem	10	0	yes
			Masc	0	10	No
			neut	0	10	no

Conclusions

- Gender and noun class are productively correlated
  - Nominative singular endings productively predict gender
  - **Gender productively predicts noun class (via nom. sg. endings)**
  - Noun classes II and III productively predict gender

  - Meaning children may use and exploit these correlations to acquire complex case systems.

Next steps: a Wug test

- We plan to run Serbo-Croatian speaking 2-3 year olds in a wug test to elicited case suffixes and gender marking (Berko 1958)
- We will use this to determine whether children's gender marking patterns can predict the cases the know.
- Thus far, we've conducted a pilot wug test with 30 Serbian-speaking adults (find me later to hear more)

Bibliography

- Berko. J. (1958). The child's learning of English morphology, Word, 14, 150-177.
- Brown, W., & Alt, T. (2004). *A Handbook of Bosnian, Serbian, and Croatian*. The Slavic and Eurasian Language Resource Center .
- Kostić, D. (1999). Frekvencijski recnik savremenog srpskog jezika (Frequency Dictionary of Contemporary Serbian Language). Institute for Experimental Phonetics and Speech Pathology & Laboratory of Experimental Psychology, University of Belgrade, Serbia.
- Kovačević, M., Palmović, M., & Hržica, G. (2009). The acquisition of case, number, and gender in Croatian. In Development of Nominal Inflection in First Language Acuiqision (pp. 153–177).
- Schuler, K. D., Yang, C., & Newport, E. L. (2016). Testing the Tolerance Principle: Children form productive rules when it is more computationally efficient to do so. In *CogSci* (Vol. 38, pp. 2321-2326).
- Marquis, A., & Shi, R. (2015). The beginning of morphological learning: Evidence from verb morpheme processing in preverbal infants. In R. de Almeida & C. Manouilidou (Eds.), Verb Concepts: Cognitive Science Perspectives on Verb Representation and Processing (pp. 279-295), Springer International Publishing Switzerland
- Weisser, P. (2006). A distributed morphology analysis of Croatian noun inflections. *Linguistische Arbeits Berichte*, *84*, 131–142.
- Yang, C. (2016). The Price of Productivity. MIT press

Questions?

Children acquiring Serbo-Croatian and other Slavic languages must acquire complex systems of nominal case inflection. Serbo-Croatian obligatorily marks nouns for 1 of 7 cases, 1 of 3 noun classes, and singular/plural. The inflectional paradigm is further obscured by much syncretism/homophony across the noun classes along with various phonological phenomena. Unraveling such a complicated paradigm through individual inflected word tokens poses a significant challenge for young children. We propose that children exploit a productive correlation between gender and noun class to acquire this paradigm more easily.
We first apply the Tolerance Principle (Yang 2015) on corpus data to answer:

Is there a productive correlation between gender and noun class?

We find that there is a productive correlation. Therefore, children could theoretically exploit it in their acquisition of case inflection. We then pilot a study aimed at answering our second question:

Do children use the correlation between gender and noun class to acquire the case inflectional system?

Due to the pandemic we were only able to pilot this second study with adults.