Inducing Low-level Schema Extraction with Artificial Suffixes

Nada Ševa (ns9@stir.ac.uk)
Department of Psychology, University of Stirling,
Stirling, Scotland, FK9 4LA, UK

Vera Kempe (vk2@stir.ac.uk)
Department of Psychology, University of Stirling,
Stirling, Scotland, FK9 4LA,UK

Patricia J. Brooks (pbrooks@mail.csi.cuny.edu)
Department of Psychology, College of Staten Island, City University of New York
Staten Island, NY 10314, USA

Abstract

Serbian and Russian children produce fewer adjective-noun gender-agreement errors with diminutive nouns (e.g. *ribica* 'little fish') than with their simplex counterparts (e.g. *riba* 'fish'). This study explores factors responsible for the diminutive advantage, using a gender-agreement task with Serbian-speaking children (N=24, mean age 4;4). Over four sessions, children were introduced to pictures of unfamiliar objects and animals that were labelled using novel nouns, varying in grammatical gender and derivational status, with half of the nouns introduced in simplex form and the other half in pseudo-diminutive form. Pseudo-diminutives were artificial derivations that mimic the regular morphological gender marking of Serbian diminutives, using unfamiliar artificial suffixes (*–upa* for feminine, *–uf* for masculine). Results indicated a pseudo-diminutive advantage for gender agreement by Session 2, suggesting that low-level schema extraction is a relatively fast process, based on morpho-phonological homogeneity of word clusters.

Keywords: Psychology; Language acquisition; Learning; Developmental experimentation.

Introduction

Early cross-linguistic studies showed that the complexity and transparency of morpho-phonological features at the ends of words affects the learning trajectories of languages with complex morphological systems (Johnston & Slobin, 1979; Slobin & Bever, 1981). Despite the observed cross-linguistic differences in learning rates, it has generally been assumed that complex morphological systems are fully mastered by children between two and four years of age. However, in a recent study of case-marking in adult native speakers of Polish, using an elicitation task with novel nouns, Dabrowska (2004) showed that even adults commit a sizable number of errors involving neuter nouns, which despite their high regularity within the case-marking system comprise only a small proportion of Polish nouns. These data suggest that the acquisition of complex morphological systems like case marking is heavily dependent on the type frequency and phonological homogeneity of clusters of words, and that while the most prominent and frequent parts of the system are learned by the age of four, the less frequent constructions may be acquired at a later point during development, and may still present problems in adulthood. These findings emphasize the role of low-level schema extraction in the organization of the mental lexicon: Learners of complex morphological systems start out with generalisations over a limited set of phonologically homogeneous words before moving on to rule-like generalizations that apply more broadly across the system (Bybee, 1995; Dabrowska, 2004; Tomasello, 2003).

Recent research on the role of child-directed speech (CDS) in the acquisition of complex morphological systems has shown that the input presented to children tends to contain sizable clusters of morpho-phonologically homogeneous words. Specifically, one of the features shown to be pervasive in the CDS of many languages is the frequent use of diminutives. Diminutives are morphological derivations (e.g. in English *doggy, bootie, Patty*) that indicate smallness, and connote endearment and affection. The semantic and pragmatic features of this derivation are almost universal across languages (Jurafsky, 1996).

In a series of corpus analyses, a high frequency of diminutives in CDS has been observed in a wide range of languages including Russian, Spanish, Italian, Polish, Dutch, Greek and Lithuanian (De Marko, 1998; Haman, 2003; Kempe, Brooks & Pirott, 2001; Melzi & King, 2003; Savickiene, 1998; Stephany, 1997). In those languages, diminutives form densely populated phonological neighbourhoods, which serve as low-level schemata so that acquired inflectional changes can be applied to all members of the cluster in a uniform way. Moreover, in some languages, such as Russian and Lithuanian, diminutives regularize the system of noun morphology by rendering morpho-phonological gender and case marking more transparent. Because of these features, diminutives are excellent candidates for the formation of a low-level schema. Consequently, in these languages diminutives should facilitate the acquisition of noun morphology, with children learning gender agreement and case marking faster with diminutives than with their simplex counterparts. This hypothesis has been tested experimentally for Russian and Polish. Using a gender-agreement elicitation paradigm, Kempe, Brooks, Mironova and Fedorova (2003) presented Russian three- and four-year-olds with familiar and novel, simplex and diminutive nouns, and demonstrated that children produced fewer gender-agreement errors with diminutive nouns in comparison to simplex forms of the same nouns (the children also committing fewer errors with familiar nouns than novel ones, and with masculine nouns than feminine ones). Similarly, Russian and Polish children have been shown to commit

fewer case-marking errors with diminutives as compared to simplex nouns (Dabrowska, 2006; Kempe, Brooks, Mironova, Pershukova & Fedorova, in press). Furthermore, adult English speakers exposed to a limited set of Russian phrases over four language learning sessions showed faster acquisition of grammatical gender and fewer agreement errors if the input consisted of diminutive nouns rather than their simplex counterparts (Kempe & Brooks, 2001). In sum, studies of first and second language learners of Russian, and child and adult native speakers of Polish converge on the finding that morphological features are first generalized to highly dense phonological neighbourhoods such as diminutives, and are more easily applied to novel words that fall into this low-level schema. Two parameters seem to be important for the process of low-level schema extraction: high type frequency of a particular cluster of words and phonological homogeneity of neighbourhood, which renders the cluster sufficiently distinct from other clusters of words.

However, the specific role of frequency and phonological homogeneity in the process of low-level schema extraction is not clear. Is the facilitating effect of diminutives in the learning of noun morphology mainly due to their high frequency of use or is it due to the phonological similarity of derivational morphemes creating highly homogeneous word clusters? The present study explores the role of phonological homogeneity by studying gender agreement in Serbian children. The choice of language is motivated by the fact that Serbian is similar to Russian and Polish with respect to its morphology, but differs dramatically in its frequency of diminutive usage. The next section briefly describes Serbian noun morphology in terms of its similarities and differences to Russian. It is followed by a section providing evidence of differences in diminutive frequency in Serbian and Russian CDS and its effect on morphology acquisition in the two languages.

Description of Serbian Noun Morphology

Serbian is a south Slavic language, similar to Russian and Polish, with highly inflected nominal and verb morphology. Nominal words (nouns, adjectives, pronouns and some numbers) are grouped into three major gender categories: masculine nouns usually end in a consonant, like *zec-Ø* [rabbit]; feminine nouns end in *–a*, like *mačk-a* [cat] and neuter nouns end in *–o* and *–e*, like *sel-o* [village] or *det-e* [child]. There are also sets of nouns that are non-transparent with respect to the relationship between word ending and gender. The first is a relatively small group of masculine nouns ending in *–a*. These are nouns like *sudija* [judge], as well as hypocoristic forms of proper male names like *Aleksandar* [simplex] vs. *Aca* [hypocoristic], and hypocoristic forms for some animal and kinship terms like *medved* [bearSIM] vs. *meda* [bearHYP]. Serbian has also a few masculine nouns ending in *–o* or *–e*. Additionally, like Russian, Serbian has a small set of feminine nouns ending with a consonant, comprising mostly abstract nouns like *ljubav* [loveFEM], *smrt* [deathFEM] or *noć* [nightFEM], and a few concrete nouns, like *kost* [boneFEM]. Another group of feminine non-transparently gender marked nouns is derived using the productive suffix *-ost*, which is usually used for the nominalization of adjectives (for example *gord* [adj. proud] - *gordost* [n. pride]).

Serbian has seven cases: nominative, genitive, dative, accusative, vocative, instrumental and locative. Nouns are declined according to four declensions (for the three transparently marked genders and for non-transparent feminine nouns). Serbian case marking exhibits a large degree of inflectional syncretism, with only nine suffixes used in the entire system.

Morpho-phonological Characteristics of Serbian Diminutives

As in Russian, diminutivization in Serbian is a productive process. Diminutives can be derived from most concrete nouns and some abstract ones, e.g. *želja* [wish] - *željica* [wishDIM], as well as from some adjectives and adverbs. Several suffixes are used for diminutive derivation. The most frequent Serbian diminutive suffixes are *–ić* for masculine, *–ica* for feminine, and *–ce* for neuter nouns. There is also a set of complex derivations of masculine and neuter suffixes *–čić*, *–ance*, *–ence*, *–ašce*, *–ešce*, and more archaic and regional forms like *–ak* and *–če*. Diminutive suffixes retain the grammatical gender of the simplex forms of the nouns. As in Russian, Serbian has lexicalised or frozen diminutives, which have taken on distinct meanings from the corresponding simplex noun, e.g. *četkica*, [toothbrush] is the lexicalized diminutive of *četka* [brush].

The major difference between Serbian and Russian diminutive formation is that Serbian diminutive suffixes are poly-functional (Stevanović, 1964; Klajn, 2003). In addition to denoting smallness, endearment and affection, they are used in other derivational processes, such as nominalization of adjectives and adverbs or derivation of compound nouns. For example, the Serbian diminutive suffix *–ica* is considered to be the most productive suffix in Serbian (Stevanović, 1964; Klajn, 2003). It is used as a suffix which changes the gender of simplex nouns from masculine to feminine, e.g. *lav* [lionMAS]-*lavica* [lionessFEM], or derives a new noun semantically related to the stem, e.g. *sto-stolica* [table-chair]. Despite this difference, the Serbian noun system is very similar to Russian. Based on the high degree of similarity between the systems, one might expect a similar distribution of diminutives in Serbian CDS as in Russian CDS.

Distribution of Diminutives in Serbian CDS and Its Effect on Learning Noun Morphology

A preliminary corpus analysis of the distribution of diminutives in Serbian CDS (Ševa, Kempe & Brooks, 2005) revealed a rather unexpected difference in frequency relative to Russian. For both languages, the distribution of diminutives was calculated from the first 100 nouns produced by 4 mothers in conversations with their children, 2 boys and 2 girls, at 20 and 34 months of age, who were selected from larger corpora of CDS to match the age of the children across the two languages. As depicted in Figure 1, the frequency of diminutives in CDS differs by a magnitude (an average of 45% of nouns in Russian and 7% in Serbian), despite the relatively similar noun and diminutive morphology in Serbian and Russian.

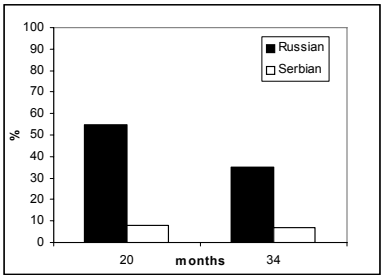

Figure 1: Diminutive Usage in Russian and Serbian CDS

A possible explanation for the obtained difference, which may be related to cultural differences, different recording conditions, or a combination of several other factors, is beyond the scope of this paper. Still, whatever the basis for the relatively small frequency of diminutives in Serbian CDS, it should attenuate the diminutive advantage in morphology learning, if frequency is indeed the crucial factor that drives low-level schema extraction. If, on the other hand, Serbian children exhibit a diminutive advantage in gender agreement and case-marking production of similar magnitude as in Russian, this would suggest that it is not frequency *per se* that is responsible for the effect, but that the low-level schema extraction is also strongly driven by morpho-phonological homogeneity.

In Ševa et al. (2005), we utilized the gender-agreement elicitation methodology developed for Russian (Kempe et al., 2003), in order to see whether the diminutive advantage would be attenuated given the lower frequency in Serbian CDS. Children (N=22, mean age 3;7) were presented with 32 pictures of familiar and unfamiliar pictures of animals. The results showed effects of noun familiarity, derivational status and noun gender similar to the ones obtained for Russian. Most importantly, the diminutive advantage was similar to Russian, both in terms of the distribution of gender-agreement errors as well as its effect size.

To study case marking, we used the elicitation methodology developed for the Russian case-marking experiment of Kempe et al. (in press). Serbian-speaking children (N=24, mean age 3;8) were presented with twelve familiar and twelve novel objects and a toy elephant walking towards or away from each object, to prompt the children to use *od*+genitive [from+genitive] or *prema*+dative [towards+dative] constructions (Ševa & Kempe, 2005). The results again demonstrated that there was an advantage for diminutives compared to simplex nouns and for familiar nouns compared to novel nouns. Thus, for case-marking, the diminutive advantage was also strikingly similar to the Russian findings despite the much lower frequency of diminutives in Serbian CDS.

In sum, the strong diminutive advantage for both gender agreement and case marking in Serbian suggests that it is not the frequency of diminutives in the input nor the degree of regularization (in Serbian, gender marking in diminutives is as regular as in simplex nouns) that drives low-level schema extraction. Instead, it seems that it is the properties of diminutives that increase morpho-phonological similarity at the ends of words that are responsible for the beneficial effects on noun morphology acquisition. The present study uses pseudo-diminutives to try to demonstrate if and when the diminutive advantage emerges given an increased amount of morpho-phonological homogeneity among word endings.

Gender Agreement in Serbian Simplex and Pseudo-diminutive Nouns

Method

Participants 24 Serbian-speaking children age 3;6-5;0, mean age 4;4 years were recruited in various day-care centres in Belgrade (Serbia).

Materials We created 32 unfamiliar nouns, 16 of which ended in *–a* thus resembling the form of feminine nouns, and 16 ending in a consonant thus resembling the form of masculine nouns. All novel nouns were bi-syllabic with stress on the first syllable. We selected pictures of 16 novel animals and 16 novel objects, which were highly unusual and not readily nameable by Serbian children or adults, and assigned the novel words to the novel animals and objects. We also constructed two pseudo-noun suffixes: *–upa* for feminine nouns and *–uf* for masculine nouns, which resembled the Serbian diminutive suffixes *–ica* and *–ić* but were not familiar to the children. These suffixes were then used for the derivation of pseudo-diminutives (e.g. feminine: *krufa/krufupa, timza/timzupa.*; masculine: *forzak/forzakuf, narap/narapuf*). The nouns and their pseudo-derivations were distributed across two lists in such a way that each noun appeared as simplex in one list, and as pseudo-diminutive in the other. Nouns were divided into four groups (8 nouns per group). Order of groups and lists was counterbalanced over the four sessions. Presentation of the pictures was randomised in each session.

We selected another four familiar nouns and corresponding pictures of familiar animals and objects for practice purposes. Two antonymous adjective pairs were used to prompt the children to talk about the animals. These pairs were *lep-ružan* (mas.) vs. *lepa-ružna* (fem.) [beautiful-ugly] and *dobar-loš* (mas.) vs. *dobra-loša* (fem.) [good-bad]. The adjective endings served as indicators for correct or erroneous gender agreement. In addition, we used a toy elephant which served as protagonist in the phase of the experiment designed to increase the children's exposure to the nouns using other constructions.

Procedure Children were tested individually in four different sessions (2-7 days apart), by a female native speaker of Serbian in a room adjacent to the main activity room of the day care centre.

Each session comprised three blocks utilizing different tasks: (1) In the Practice block, children engaged in the process of labelling and describing objects and animals, and were introduced to a specific pair of adjectives to be used to describe the subsequently presented 4 test items; (2) In the Test block, the experimenter elicited the use of gender-marked adjectives as descriptions of objects and animals by

prompting the production of adjectives or adjective-noun phrases; (3) In the Additional Exposure block, children were given more opportunities to familiarize themselves with the novel nouns using the case-marking elicitation methodology described earlier.

First, the children were shown one template (practice) picture, i.e. the spider, and told: *Ovo je pauk. Da li je pauk dobar ili loš?* [This is spiderNOM. Is spiderNOM goodMAS or badMAS?]. The practice pictures were used to introduce the children to the activity, and to encourage them to produce whole sentences. Then the experimenter presented the first test picture, accompanied by the utterance: *Ovo je krufa. Pauk je dobar. A krufa?* [This is krufaNOM. SpiderNOM is goodMAS. And what about krufaNOM?]. This elicitation form avoided the experimenter's use of gender agreement, and gave the children the opportunity to pick one of the members of the adjective pair. The same adjective pair was used for four consecutive test nouns, after which the experimenter introduced a new template noun, along with the other antonymous adjective pair. Alternation of adjective pairs and order of template gender were counterbalanced.

The third block was used as an additional exposure phase, giving the children more opportunities to familiarise themselves with the nouns from the second block, but in a different type of task (case-marking task). This task was presented last because grammatical gender and case paradigms are related in Serbian (each gender is associated with a different case-marking paradigm). By presenting the case-marking task last, we eliminated the possibility that children implicitly detected the gender of the novel nouns. In this last block, we used the same elicitation paradigm as in the Russian and Serbian case-marking experiments (Kempe et al., in press, Ševa & Kempe, 2005). Childrens' responses were prompted by a toy elephant walking towards or away from each object to produce *od*+genitive [from+genitive] or *prema*+dative [towards+dative] constructions with same set of nouns as in the test phase.

In total, each session had 24 trials containing novel nouns, so that the children could hear and repeat every novel noun three times. Note that during the Test block, the children did not receive corrective feedback when they produced non-targeted adjective-noun gender-agreement in order to keep exposure conditions identical across children.

Results

For each trial of the Test block, we transcribed the child's first instance of adjective-noun gender agreement. Cases of non-targeted gender agreement as reflected in the adjective endings were recorded as the dependent variable. We coded two types of answers as non-targeted gender agreement responses: a) low frequent neuter responses (*To je lepo.* [ThisNEUT is beautifulNEUT].), which appeared only in the first two sessions and which were grammatically unmarked answers to the pronominal subject from the experimenter's item introduction sentence: *Ovo je XX*. [This is XX.] but did not conform to the provided response template, and b) real agreement errors (*Krufa je lep.* [KrufaFEM is beautifulMASC.] or *Forzak je lepa*. [ForzakMASC is beautifulFEM.]).

Some items were coded as missing values because the children failed to produce an answer, or the experimenter accidentally revealed the noun gender (three in the first session, zero in the second session, one in the third session and one in the fourth session). Average agreement errors per child over four sessions computed as proportions of completed trials, corrected for the number of lost trials per subject and condition are presented in Table 1.

Table 1: Mean percentage of non-targeted answers per child. Standard derivations are given in parentheses.

	% non-targeted answers
Session 1	20.3 (14.3)
Session 2	18.2 (15.2)
Session 3	15.6 (16.7)
Session 4	11.5 (16)

We performed a (4) session x (2) derivational status: simplex vs. pseudo-diminutive x (2) gender: feminine vs. masculine within-subjects ANOVA on the proportions of non-targeted answers. The analysis yielded a main effect of noun gender, $F(1,23) = 13.9$, $p < 0.001$, which indicated that children committed more errors with feminine than with masculine nouns in all four sessions (see Figure 2), as well as a significant two-way interaction between session and noun derivation, $F(1,23) = 5.8$, $p < 0.001$ (see Figure 3).

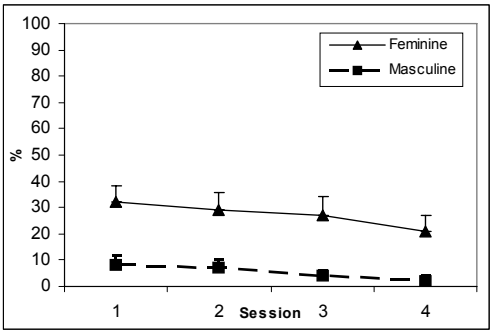

Figure 2: Mean percentage (and 1 S.E.M.) of non-targeted answers over four sessions and two genders.

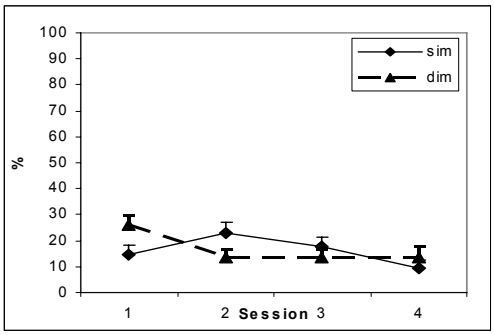

Figure 3: Mean percentage (and 1 S.E.M.) of non-targeted answers over four sessions and two derivations.

Separate ANOVAs with gender and noun derivation as within-subjects factors were conducted for each session to qualify the interaction. For Session 1, this analysis revealed a main effect of gender, $F(1,23) = 8.9$, $p < 0.05$, with better performance for masculine nouns, and a main effect of noun derivation, $F(1,23) = 8.3$, $p < 0.01$, indicating that the children performed better with simplex nouns than with the pseudo-diminutives. For Session 2, we found a main effect of gender, $F(1,23) = 7.7$, $p < 0.05$, with better performance for masculine items, and a main effect of noun derivation, $F(1,23) = 4.4$, $p < 0.05$, this time due to better performance for the pseudo-diminutives compared to the simplex nouns. For Sessions 3 and 4, we found only a significant main effect of gender, due to better performance for masculine nouns. In sum, these analyses suggest dramatic change in the effect of pseudo-diminutives: while children performed worse in these items compared to simplex nouns in Session 1, the effect was reversed in Session 2.

Separate 2 (gender) x 4 (session) ANOVAs for the simplex nouns revealed a main effect of session, $F(3,21) = 3.5$, $p < 0.05$ and a main effect of gender, $F(1,23) = 12.6$, $p < 0.01$ confirming the masculine advantage. For the pseudo-diminutives, the 2 (gender) x 4 (session) ANOVA revealed a main effect of session, $F(3,21) = 4.5$, $p < 0.01$, as well as an effect of gender, $F(1,23) = 12.4$, $p < 0.01$. Bonferroni-corrected t-tests comparing performance between all sessions confirmed an improvement in performance between Session 2 and Session 4, $t(23) = 3.0$, $p < 0.05$, for the simplex nouns, and an improvement in performance between Session 1 and 2, $t(23) = 3.4$, $p < 0.05$ for the pseudo-diminutives. These analyses suggest that the apparent increase in errors for the simplex nouns between Session 1 and 2 was not significant, while the decrease in errors for pseudo-diminutives was. Thus, performance in the simplex nouns remained largely unchanged while performance in pseudo-diminutives improved rapidly after only one session of exposure. The lack of a 3-way interaction suggests that this pattern holds for both genders.

Discussion and Conclusions

As in previous studies, we found that the children committed fewer agreement errors with masculine nouns than with feminine nouns. This confirms earlier findings on gender agreement both for Russian and Serbian, despite the fact that in the present study, the children were almost a year older (4;4 years) than in the Ševa et al., (2005) study (3;7 years). The source of the masculine advantage is not clear: One possibility is that it is due to the relatively high frequency of gender ambiguous words both in CDS and in children's speech (words like *tata* [daddy], *meda* [teddy bear] or proper names ending in *–a*), which end like feminine nouns, but take masculine gender adjectives. Such words exist in Russian as well, and Russian children also exhibit superior gender agreement performance for masculine nouns (Kempe et al., 2003). It is also possible that the masculine advantage is due to the shorter and, thus, morphologically less complex masculine adjectives (e.g. *lep, lošˇ*) which are often one syllable shorter than their feminine counterparts (e.g. *lepa, loša*). Preliminary work on gender agreement in Lithuanian (Savičkiene, Kempe & Brooks, in preparation), where masculine and feminine adjectives are of equal length, confirms the diminutive advantage but does not show a masculine advantage in gender agreement performance. Thus, gender agreement in Serbian and Russian masculine nouns might be aided by the fact that the adjectives are phonologically less complex and, thus, easier to produce.

Crucially, our findings show that a pseudo-diminutive advantage emerged already at Session 2. While the children at first committed many errors with the unfamiliar derivations, they soon seemed to treat these nouns as a phonologically more homogeneous cluster of words compared to the simplex pseudo-words, which facilitated correct gender agreement within this cluster. Thus, low-level schema extraction does not take a long time nor does it seem to require a lot of exposure to the particular word cluster. In other words, phonological homogeneity is as crucial a factor as frequency in the process of low-level schema extraction, and may be sufficient to trigger the process if a highly homogeneous cluster of words is not very frequent in the input. This can help to explain why the diminutive advantage in Serbian is of similar magnitude as in Russian despite markedly lower frequency of diminutives in the input of Serbian children.

In conclusion, we suggest that in the initial stages of low-level schema extraction, learners do not need much time and a high frequency of exposure to detect morpho-phonologically homogeneous clusters of words, and to start to generalize inflectional changes within the clusters. It seems that children are quite sensitive to morpho-phonological similarities, and that just a small cluster of homogeneous words may be enough to trigger the process of generalization given that this cluster of words is sufficiently distinct in morpho-phonological space. The fact that the high frequency of diminutives in Russian CDS did not provide an additional advantage for the Russian children suggests that phonological homogeneity might be the more important factor. Further systematic cross-linguistic work, complemented by neural network simulations, may shed more light on the interaction between frequency and morpho-phonological homogeneity over the course of morphology learning.

References

Bybee, J. L. (1995). Regular morphology and the lexicon. *Language and Cognitive Processes, 10*, 425-455.

Dabrowska, E. (2004). Rules or schemas? Evidence from Polish. *Language and Cognitive Processes*, *19 (2)*, 225-271.

Dabrowska, E. (2006). Low-level schemas or productive rules: The role of diminutives in the acquisition of Polish case inflections. *Language Sciences, 28,* 120-135.

De Marco, A. (1998). The acquisition of diminutives in Italian. In S. Gillis (Ed.), *Studies in the acquisition of number and diminutive marking.* Antwerp papers in Linguistics, 95. Antwerp: Universiteit Anwerpen.

Gillis, S. (1997). The acquisition of diminutives in Dutch. In: W. Dressler (ed.) *Studies in pre- and protomorphology* (pp. 165-179). Vienna: Verlag der Österreichischen Akademie der Wissenschaften.

Gillis, S. (Ed.) (1998). *Studies in the acquisition of number and diminutive marking*. Antwerp Papers in Linguistics, 95. Antwerp: Universiteit Anwerpen.

Haman, E. (2003): Early productivity in derivation: A case study of diminutives in the acquisition of Polish. *Psychology of Language and Communication, 7,* 37-56.

Johnston, J. R. & Slobin, D. I. (1979). The development of locative expressions in English, Italian, Serbo- Croatian and Turkish. *Journal of Child Language, 6*, 531-547.

Jurafsky, D. (1996) Universal tendencies in the semantics of the diminutive, *Language, 72,* 533-578.

Kempe V. & Brooks, P. J. (2001). The role of diminutives in Russian gender learning: Can child-directed speech facilitate the acquisition of inflectional morphology? *Language Learning, 51,* 221-256.

Kempe V., Brooks, P. J. & Pirott, L. (2001). How can child-directed speech facilitate the acquisition of morphology? In M. Almgren, A. Barrena, M.-J. Ezeizabarrena, I. Idiazabal, & B. MacWhinney (Eds.), *Research on Child Language Acquisition: Proceedings of the 8th conference of the International Association for the Study of Child Language* (pp. 1237-1247). Medford, MA: Cascadilla Press.

Kempe, V., Brooks, P. J., Mironova, N. & Fedorova, O. (2003). Diminutivization supports gender acquisition in Russian children. *Journal of Child Language, 30*, 471-485.

Kempe, V., Brooks, P. J., Mironova, N., Pershukova, A. & Fedorova, O. (in press). Playing with word endings: Morphological variation in the learning of Russian noun inflections. *British Journal of Developmental Psychology.*

Klajn, I. (2003). *Tvorba reči u srpskom jeziku: Sufiksacija i konverzija*. Zavod za udžbenike i nastavna sredstva, Matica srpska i Institut za srpski jezik. Beograd.

Melzi, G. & King, K.A. (2003). Spanish diminutives in mother-child conversations. *Journal of Child Language, 30*, 281-304.

Savičkiene, I. (2003). The acquisition of diminutives in Lithuanian. In S. Gillis (Ed.), *Studies in the Acquisition of number and diminutive marking*. Antwerp Papers in Linguistics, 95. Antwerp: Universiteit Anwerpen.

Savičkiene, I., Kempe, V. & Brooks, P. J. (in preparation). The diminutive advantage in gender agreement of Lithuanian children.

Ševa, N & Kempe, V. (2005). Serbian diminutives aid case-marking acquisition in Serbian. Poster presented at the *Post-Cognitivist Psychology Conference.* Glasgow, UK.

Ševa, N. Kempe, V. & Brooks, P. J. (2005). Serbian diminutives facilitate gender acquisition despite low frequency in child-directed speech. Poster presented at the *Biennial conference of the Society for Research in Child Development.* Atlanta, USA.

Slobin, D. I., & Bever, T. G. (1982). Children use canonical sentence schemas: A crosslinguistic study of word order and inflections. *Cognition, 12*, 229-265.

Stephany, U. (1997). Diminutives in early child Greek. In W. U. Dressler (Ed.), *Studies in pre- and protomorphology*. Vienna: Osterreichische Akademie der Wissenschaften.

Stevanović, M. (1964). *Savremeni srpskohravtski jezik I-II*. Beograd: Naučna knjiga.

Tomasello, M. (2003). *Constructing a language: A usage-based theory of child language acquisition.* Harvard University Press, Cambridge, MA.