

PROCEEDINGS OF THE
XXIII SCIENTIFIC
CONFERENCE



EMPIRICAL STUDIES IN PSYCHOLOGY

MARCH 24-26, 2017

FACULTY OF PHILOSOPHY, UNIVERSITY OF BELGRADE



INSTITUTE OF PSYCHOLOGY
LABORATORY FOR EXPERIMENTAL PSYCHOLOGY
FACULTY OF PHILOSOPHY, UNIVERSITY OF BELGRADE

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Institute of Psychology, Faculty of Philosophy, University of Belgrade



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UNIVERZITET U BEOGRADU

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Belgrade 2017

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PARTS OF SPEECH IN EARLY SERBIAN CHILD LANGUAGE¹

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The study was aimed at the preliminary quantitative exploration of distribution of parts of speech in Serbian children's early language production and comparisons with the distribution in language input. The Serbian Corpus of Early Child Language (SCECL) was used in retrieving production of children and adults longitudinally recorded in interaction sequences at 16 age levels (18-48 months). Automatic lemmatization and manual check and corrections were made on six parts of speech, mainly content words: nouns, verbs, adjectives, adverbs, pronouns, and prepositions. In order to make a better differentiation between language structure and language use, information on the distribution of parts of speech from a large corpus of standard Serbian written language was also included in the analysis. The findings reveal a high degree of similarity between the parts of speech distributions in child language and conversational language input. In comparison to the distribution in written Serbian language, it reveals that formation of structure in child language is not influenced by language structure itself but by functional aspects of its use in natural face-to-face interaction. Child language deviates from language input at early stages of development, and incremental approximation towards the model distribution is recorded. The findings are in accordance with distributional accounts in the theory of language acquisition.

Keywords: child language, adults' language, parts of speech, distribution, spontaneous production

Introduction

By virtue of emergentist and usage-based approach (Elman, Bates, Johnson, Karlmilloff-Smith, & Plunkett, 1996; Lieven, Behrens, Speares & Tomasello, 2003; Tomasello, 2003) exploration of distributions of language structures in different samples attracted much of attention recently in the field of language acquisition (Adi-Bensaid, Ben-David & Tubul-Lavy, 2015; Behrens, 2006; Tomasello & Stahl, 2004). They rely on the hypothesis that inductive learning is the main impeller of language development driven by the frequency and statistical regularities in the distribution of structures in language input.

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This study is a preliminary quantitative exploration focused on distributions of parts of speech in samples of early Serbian child language and comparisons with distributions of parts of speech available in samples of Serbian adults' language. The main aim is to focus on the degree of similarity/difference between spontaneous children's production and language input as a source of information on structural regularities for young learners of Serbian. Developmental regularities in the acquisition of word classes are traced and special attention was devoted to deviation from adults. The study is also a source of information on basic properties of the used language samples from the *Serbian Corpus of Early Child Language (SCECL)*.

Method

The SCECL corpus (Anđelković, Ševa & Moskovljević, 2001) contains the samples of language production of 8 children and accompanying adults longitudinally recorded in spontaneous interaction sequences at 16 age levels from 18 to 48 months of children's age. The corpus is compiled in the *CHILDES* database (MacWhinney, 2000) and contains almost one million of words, with more than 785000 produced by adults and 205000 by children. The samples of children's and adults' production were separately retrieved, and the additional preparatory procedure was applied - all the words were automatically lemmatized by means of data from the *Frequency Dictionary of Contemporary Serbian Language* (Kostić, 1999). Manual check and corrections of lemmas were made for six parts of speech (mainly content words): nouns, verbs, adjectives, adverbs, pronouns, prepositions. Other parts of speech (connectives, particles, interjections, and numbers) due to a widely spread homography were subject to a high proportion of miss-lemmatization and consequently pulled together into one category named *rest*. A special attention was devoted to low age levels (18-26 months). Words produced by children in a way that phonologically deviates from standard Serbian language were manually lemmatized. It enabled that a large number of children's words unconventionally pronounced due to developmental constraints was also included in the analysis. All rhymes, curse words, onomatopoeias, vocalizations, and exclamations were excluded from the analysis.

Three sources of data were included in comparisons: children's language production from the *SCECL* corpus, input language produced by adults in the same corpus, and information on parts of speech frequency from a highly reliable corpus of contemporary standard Serbian language (Kostić, Đ., 1965).

Results

Nouns and verbs are considered to be the most frequent word classes in the Serbian language - 36.85% and 15.78% respectively (Kostić, 1965). But it should be noted that this information was obtained on a sample written language. Our results provide the evidence that the distribution of parts of speech in conversational language produced in the spontaneous interaction between children and adults is different (Figure 1).

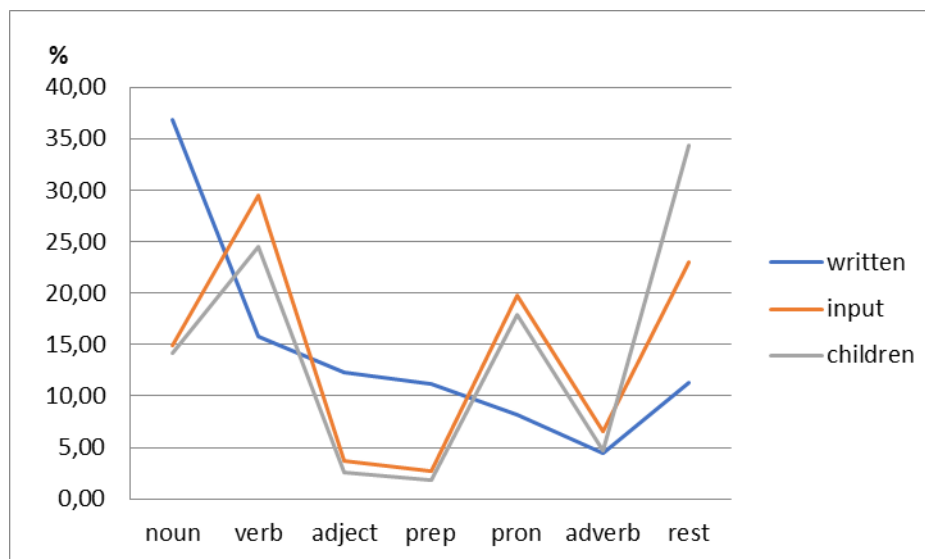


Figure 1. Distributions of parts of speech in different Serbian language samples: written language, conversational language input, and child language. Data on written language were obtained from Kostić, Đ. (1965).

The most frequent word classes in conversational language input are verbs (29.46%), followed by pronouns (19.72) and nouns (14.97). Very similar distribution is found in the children's production. The largest difference between adult's language input and children's production is in the category *rest* which is more frequent in children than in adults, due to a relatively high proportion of non-interpretable words at early age levels. Statistical analysis shows that correlation between distributions in input and child language is very high and significant, while distribution in written language is different (Table 1).

Table 1

Comparisons of the parts of speech distributions in written language, conversational language input, and child language

| | | Correlations | | |
|-----------------|--------------------------|--------------|--------|----------|
| | | written | input | children |
| Kendall's tau_b | Correlation Coefficient | 1.000 | .238 | .143 |
| | written Sig. (2-tailed) | | .453 | .652 |
| | N | 7 | 7 | 7 |
| | Correlation Coefficient | .238 | 1.000 | .905** |
| | CDS Sig. (2-tailed) | .453 | | .004 |
| | N | 7 | 7 | 7 |
| | Correlation Coefficient | .143 | .905** | 1.000 |
| | children Sig. (2-tailed) | .652 | .004 | |
| | N | 7 | 7 | 7 |
| Spearman's rho | Correlation Coefficient | 1.000 | .286 | .214 |
| | written Sig. (2-tailed) | | .535 | .645 |
| | N | 7 | 7 | 7 |
| | Correlation Coefficient | .286 | 1.000 | .964** |
| | CDS Sig. (2-tailed) | .535 | | < .001 |
| | N | 7 | 7 | 7 |
| | Correlation Coefficient | .214 | .964** | 1.000 |
| | children Sig. (2-tailed) | .645 | < .001 | |
| | N | 7 | 7 | 7 |

** Correlation is significant at the 0.01 level (2-tailed).

Distributions of parts of speech across age levels

Further inspection of data shows that distribution of language input is highly homogenous across different samples of target child's age (Figure 2). The range of differences in the proportions of particular parts of speech across age levels is only between 1.84% and 5.04%.

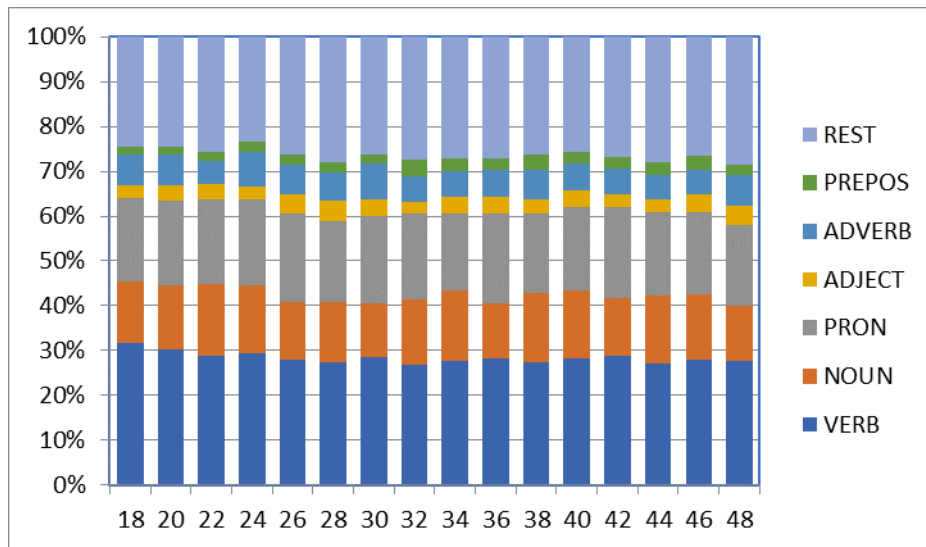


Figure 2. Distribution of parts of speech in language input across the target child's age

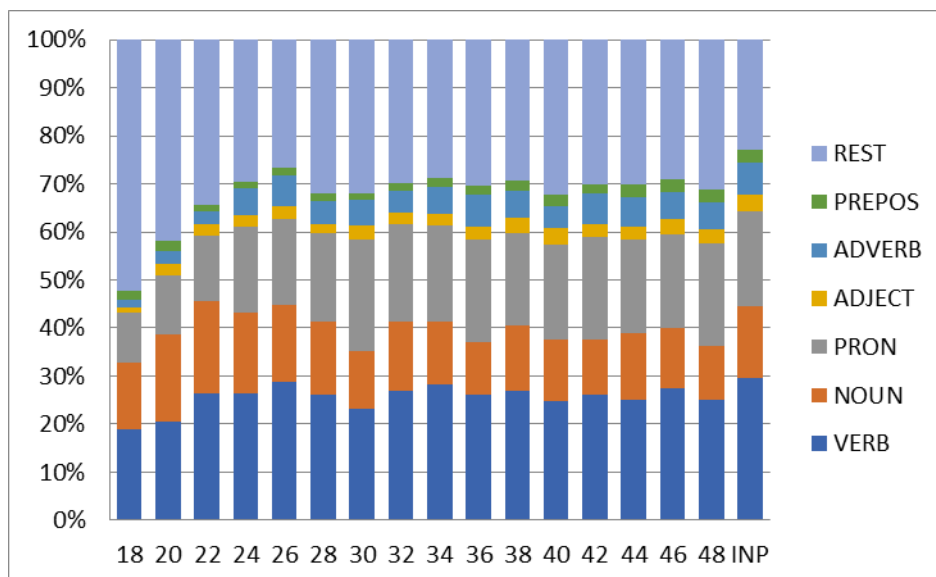


Figure 3. Parts of speech in children's language across age and language input (INP)

Contrary, the parts of speech distribution in child language across age levels deviates from distribution in language input at the lower stages (Figure 3).

Since manual check of lemmatization of children's production was made up to 26 months of age, statistical comparisons with the language input were made for the first 5 age levels (Table 2). The comparisons reveal that the children's distribution from 18-26 months of age deviates significantly from language input, but it has a stable tendency to approximate the adults' distribution in the course of time.

Table 2

Approximation of the children's parts of speech distributions across age to the distribution in language input

Parts of speech in 18-26 months old children and adults

| | N | df | Chi-square | p | C-coef. | p |
|------------------|-------|----|------------|------|---------|------|
| All ages X input | 12277 | 30 | 572.361 | 0.01 | 0.211 | 0.01 |
| 18m X input | 7399 | 6 | 374.018 | 0.01 | 0.219 | 0.01 |
| 20m X input | 7496 | 6 | 201.953 | 0.01 | 0.162 | 0.01 |
| 22m X input | 7423 | 6 | 102.809 | 0.01 | 0.117 | 0.01 |
| 24m X input | 7960 | 6 | 49.316 | 0.01 | 0.078 | 0.01 |
| 26m X input | 8109 | 6 | 18.714 | 0.01 | 0.048 | 0.01 |

Conclusion

An astonishing similarity is exhibited between the distributions of parts of speech in spontaneous child language and conversational language input. In comparison to the distribution of standard written Serbian language, it reveals that formation of structure in child language is not influenced by language structure itself but by functional aspects of its use in natural face-to-face interaction. The data reveal a prominent function of verbs in conversational language which is referring to events and actions relatively more often than standard written language.

In spite of the large similarity between the overall sample of child language and language input, thorough inspection of data uncovered hidden differences across age. Child language deviates from language input at early stages of development, and incremental approximation towards the model distribution is recorded. It is an additional empirical evidence for the hypothesis of inductive and incremental growth of language offered by the distributional accounts in the theory of language acquisition.

Since the findings are only preliminary, further manual work on the accuracy of the *SCECL* corpus will enable more detailed exploration of developmental changes on all age levels. Missing estimation is when the process of approximation towards the input language is about to end. An inspection of individual differences among children is also planned for the purpose of exploration of different developmental rates.

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