

Syllable structure and sonority: The case of Russian-speaking children with SLI

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There is a general agreement that phonology is frequently impaired in children affected by Specific Language Impairment (SLI) (Bishop 1997, Leonard 1998), but the precise nature of this deficit is currently a matter of debate. There are two theories that are most relevant for the study presented below. The first theory (Gathercole & Baddeley 1990, Conti-Ramsden 2003) holds that the underlying cause of SLI is impairment in phonological short-term memory as revealed by poor performance in pseudo-word repetition tasks. The second theory (van der Lely & Howard 1993, Marshall et al. 2002, 2003) proposes that the underlying cause of SLI is a phonological deficit, which results in an impairment of phonological memory and therefore poor performance on pseudo-word repetition tasks.

This study was designed to test the Marshall et al. (2002, 2003) hypothesis regarding the unavailability of the marked syllable structures to SLI children and to explore the importance of phonotactics in general for SLI children. The study was conducted with monolingual Russian-speaking children. The experimental group subjects come from a village in Northern Russia with a population approximately 900 people. Nearly all residents of this village form a single pedigree structure, and the presence of language disorders is significantly higher than in the general population. 16 monolingual Russian-speaking children aged 4;5–10;10 took part in the experiment (6 classified as SLI and 10 as Typically Developed (TD)). The subjects were classified based on the calculations of Mean Length of Utterance (MLU) and Syntactic Complexity (SC) for all children.

The experiment utilized a pseudo-word repetition task. In constructing pseudo-words, we manipulated the syllable complexity with respect to the number and type of consonants in the syllable onset and coda, the total number of syllables in the word, and the placement of stress (1). These parameters allowed us to examine the effect of the general working memory load, the complexity of syllable structure, the location of stress, and the interaction of these factors.

The results show that the word length is a factor in pseudo-word repetition task, and thus working memory capacity is extremely important in word storage and recall. In addition, syllable complexity is also a factor that affects memorization of pseudo-words. The effect on processing complexity cannot be explained by limitations on working memory capacity alone because the syllable complexity is not determined by the number of phonemes in a syllable, but rather by the phonological organization of that syllable. The results indicate that there is a continuum of complexity of syllable structure, with CV being the easiest and CCVCC being the hardest in our data. The effect of complex codas is more pronounced than the effect of complex onsets.

Importantly, the analysis of the types of errors demonstrates that sonority plays a role in the observed syllable structure effects. No previous theory of language impairment or word storage and recall has remarked on the role of sonority in determining the difficulty of remembering a syllable. Yet, unless sonority is crucially implicated, we expect random deletion of consonants in complex onsets or deletion of consonants determined by their linear order. This is clearly not the pattern that we observe: only the liquid deletes in obstruent-liquid clusters, whereas either the first or the last consonant deletes in obstruent-obstruent clusters. Thus, sonority seems to determine which consonant is dropped. The more sonorant liquid deletes, leaving the obstruent as the only consonant in the onset and therefore creating the more salient core syllable. On the other hand, when the two consonants within the onset cluster are of equal sonority, either one can be deleted creating an equally acceptable syllable (on the notion of sonority and the sonority hierarchy, see Blevins 1995, among others).

In summary, the study shows that both phonological memory and syllable complexity play a role in determining children's ability to remember pseudo-words. Moreover, the relevant definition of syllable complexity crucially relies on sonority, a notion that has not been adequately considered in previous studies.

(1) Relevant conditions for a one-syllable pseudo-word

a. CV; 1syll; 1 st syll stress	<i>pa</i>
b. CVC; 1 syll; 1 st syll stress	<i>pak</i>
c. CCV; 1 syll; 1 st syll stress	<i>pra</i>
d. CVCC; 1syll; 1 st syll stress	<i>pask</i>
e. CCVC; 1 syll; 1 st syll stress	<i>prak</i>
f. CCVCC; 1 syll; 1 st syll stress	<i>prask</i>

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