Cluster simplification in Russian children with Specific Language Impairment

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Much data on the behaviour of clusters in nonword repetition tasks [3] are drawn from Germanic languages (primarily English), with tightly restricted cluster possibilities. For instance, previous studies of cluster simplification in the productions of young children have found a tendency to preserve the obstruent in onset clusters and the sonorant in coda clusters; [2] and [4] suggest this may be due to universal syllable markedness. However, Russian is more permissive: unlike in English, Russian onset and coda clusters can both increase and decrease in sonority and thus, both unmarked and marked clusters are attested. This paper reports results from a nonword repetition study that addresses the strategies of cluster simplification in two matched Russian-speaking child populations aged 7-10, one typically developing (TD) and one with specific language impairment (SLI). Subjects were matched for age and all had IQs in the normal range. The findings support the view that the nature of phonological deficit in SLI is a phonological short-term memory impairment and consider implications of cluster simplification.

Method. The stimuli consisted of 144 disyllabic nonwords. Stimuli were designed to test repetition accuracy of consonant clusters of various sizes, varying sonority, and in different word positions (initial or final). 72 non-words had CC clusters; 36 had CCC clusters, and the remainder had singleton consonants. Clusters were divided evenly among onsets and codas, and among rising, level, and falling sonority (1). Clusters that obey the Sonority Sequencing Generalization (SSG), that is, onsets of rising sonority and codas of falling sonority were coded as marked, while the others were coded as unmarked. Half of CC clusters were attested in actual Russian words, and none of the CCC clusters used in the stimuli were attested.

Results. Overall, SLI children were less accurate than TD children (Chi-square test, $p < .008$). SLI subjects make more errors in clusters than TD subjects do ($p < .003$). Larger-sized CCC clusters were more prone to error in both groups than smaller-sized CC clusters (for TD, $p < .001$, for SLI, $p < .001$). While TD subjects were more accurate in attested clusters ($p < .01$), for SLI subjects, cluster attestedness was not significant.

Errors in the production of clusters ranged over deletion, epenthesis, metathesis, assimilation, dissimilation, substitution, and reduplication (2). This study focuses on deletion, which was the most common repair for both groups of children. The study showed that children with SLI delete more than TD children. For both groups, deletion of a consonant adjacent to vowel was inhibited.

Implications. This study has several important implications. First, as documented for a related population by [5], the differences in production patterns between TD and SLI children are essentially quantitative, not qualitative. Children with SLI exhibit a higher error rate overall, but the main tendencies are similar. Nonword repetition has been used in the past as a measure of phonological memory [3], [8]. Our results support the view that the phonological deficit in individuals with SLI involves decreased phonological short-term memory, not a restriction to the most unmarked (CV) syllable structure [6].

Second, it is important to consider languages with a diverse set of onset and coda clusters when formulating theories of cluster reduction. If syllable markedness determines the identity of the consonant surviving a cluster simplification process, then, unlike in the Russian data, consonant type, not position, should be the main predictor. Our interpretation of the tendency to accurately reproduce the vowel-adjacent member of a cluster is that children are most accurate at producing those chunks of the target word for which they have established, well-practiced production routines; in this case, CV and VC chunks. Our findings thus have broader implications for the relationship between lexical storage and production grammars (see e.g. [1], [7]).

(1) Stimuli (examples)

Cluster size	Word position	Sonority
CC: **bn**apa, **db**ota, **lb**uka	Onset: **br**upa, **pfl**ata	Rising: **kr**ata, kabu**kr**
CCC: **gmr**ota, **ptk**oka, **nzb**oka	Coda: tabo**lk**, tako**dnl**	Falling: **lb**uka, tabo**lk**
		Level: **db**ota, paka**pk**

(2) Repairs in clusters

Repair to cluster	#tokens	Example target word	Pronunciation
Deletion	624	ptkoka	ptoka
Segmental change	436	patubml	patugmn
Epenthesis (C or V)	128	pmota mtupa	ptmota mutupa
Assimilation	129	mnota	n:ota
Metathesis	124	pakatp	pakapt

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