The Acquisition of Word-Initial Consonant Cluster Production in Russian: A Case Study.

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The acquisition of word-initial consonant clusters (ICCs) is one of the lengthiest aspects of children's speech development continuing until the age of eight (Gvozdev, 1981; McLeod et al., 2001; Vihman, 1996). Production difficulties are evident in the earliest stages. At around 2 years of age, children show frequent tendencies to omit and reduce ICCs to single consonants in a wide range of languages (Greenlee, 1974; Lleó & Prinz, 1996; Ohala, 1999; Szreder, 2013). The majority of phonological approaches attempt to model discrepancies between child and adult speech, with less attention to children whose pronunciation of ICCs tends towards accuracy. In contrast, this paper presents findings on ICC production in Russian from a longitudinal study of a 2-year-old bilingual heritage Russian-American English child, Uliyana, where accurate production is acquired quickly. The complexities of Russian ICCs, along with the dense nature of the corpus allow us to evaluate two properties of the Linked-Attractor model (Menn, Schmidt, & Nicholas, 2013): (i) Does the frequency of the input and output forms play a role in the accuracy of a child's ICC articulation? (ii) Does the perceptual salience of the ICC play a role in the order of acquisition of ICC production?

The data is based on 18 1-hour transcribed samples from the *Uliyana* dense corpus of naturalistic speech collected with the help of the LENA^{TM} system during the third year of the child's life. The data examined is of interest for several reasons. First, though Russian ICCs have a range of important properties (e.g. violations of the Sonority Sequencing Principle as in *lgat'* 'to lie', *rtut'* 'mercury', *mgla* 'haze'; violations of Sonority Distance Constraints as in *mnogo* 'a lot', *bdenie* 'vigil'; violations of versions of the Obligatory Contour Principle as in *zdes'* 'here', *vbezhat'* 'run into'), there is limited information on the acquisition of ICCs in the early speech of Russian monolingual children. According to Gvozdev (1981) and Eliseeva (2008), at the age of 2 years, Russian monolingual children do not produce ICCs, which are usually omitted or reduced to a singleton. Second, Uliyana shows an exceptional path of phonological development. At the age of 24 months her consonant inventory included 34 phonemes and was fully established by the age of 3 years. At 24 months, she also produced four types of ICCs: stop + stop (e.g., ['ktota] *kto-to* 'somebody'), stop + sonorant (e.g., ['kroʂka] *kroshka* 'crump', /s/ + stop (e.g., [spʲit] *spit* '(he) sleeps'), and sonorant + sonorant (e.g., [mnʲe] *mne* ' to me'), and by 3 years, she produced almost all types of ICCs presented in the input.

Our initial results suggest that most models, including the psycholinguistic Linked-Attractor model (Menn et.al., 2013) are biased towards non-exceptional learners whose production shows much more synchronic and diachronic variability within and across words. In contrast, Uliyana's input and output are characterized by relative uniformity. Overall, the average percentage of words containing ICCs in the input is 12%, while that in the output is 11%. The sequence of ICC acquisition is illustrated in Table 1. It starts with the perceptually salient and relatively frequent /s/+stop and /ʂ/+stop clusters with the variants in the production of word *chto* 'what' as [ʂto]/[t͡ɕo]/[ʂo] attested in the input. The obstruent + [v] clusters and the fricative + sonorant clusters are acquired by the age of 30 months, while the sonorant + [v] clusters (input: 0.14%; output: 0.24%) underwent reduction (e.g., *rvat'* 'tear' [vatʲ]. The stop + stop clusters with salient C_2-V transitions were acquired latest. We attribute this to a feature of child-directed speech: namely that many tokens of the high frequency words *gde* 'where' and *kto* 'who' had articulatorily simplified initial clusters. These same clusters were simplified by the child during the entire year. Stop + sonorant clusters were also produced relatively late. In this case, the cause appears to be late mastery of the fine motor control required for articulation of the trill.

For a child with exceptional production skills, we conclude that frequency of input can influence frequency of output, but there are other factors such as perceptual salience and the fine motor control play a role in the acquisition of accurate ICC production.

Tables

Table 1. Uliyana's ICC production across time by type: comparison of input and output

ICC Type		Example	Input* (%)	Output (%)	Age of Acq
/s/+stop		*skazka* 'fairy tale'	10.8	10.1	28;02
/ş/+stop		*shkola* 'school'	14.7	16.5	
sonorant + sonorant		*mnogo* 'a lot'	2.2	1.6	
obstruent+/v/		*dvor* 'yard'	7.54	7.4	30;06
fricative +:					
	sonorant	*smotret'* 'look'	14.8	11.2	30;06
	stop	*zdes'* 'here'	7.5	4.5	31;04
	fricative	*vsjo* 'all'	8.8	5.5	32;01
stop +:					
	stop	*kto* 'who'	6.5	15.3	32;28
	sonorant	*knizhka* 'book'	26.6	27.4	

*Note: The percentages of the given ICCs of the total number of words with different ICCs.

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The acquisition of word initial TT clusters has not received much attention. Even though researchers have shown an increasing interest in the acquisition of Greek phonology, the majority of the studies are concerned with the acquisition of stress patterns (Kappa 2002b; Tzakosta 2003, 2004) or of different sounds (Kappa 2000; Nicolaidis et al. 2004; Tzakosta 2001b) in specific positions (e.g. word final consonants: Kappa, (2001). The studies that deal with consonant clusters are mostly concerned with what consonant children preserve when they simplify consonant clusters (Kappa 2002a; Tzakosta 2001a). While these studies provide some data on childrenâ€™s production of TR and TT clusters, they are typically isolated examples. The acquisition of the consonant cluster has received little attention during this time, even though the consonant cluster is a common feature of speech, its acquisition is one of the most protracted of all aspects of children's speech development, and the production of consonant clusters is one of the most common difficulties for children with speech impairment.Â Young children simplify word initial consonant clusters by omitting or substituting one (or both) of the elements.Â The purpose of the study was to present a complete picture of the acquisition of German phonology, based on a representative number of children within the main age range of speech development. In contrast, this paper presents findings on ICC production in Russian from a longitudinal study of a 2-year-old bilingual heritage Russian-American English child, Uliyana, where accurate production is acquired quickly. The complexities of Russian ICCs, along with the dense nature of the corpus allow us to evaluate two properties of the Linked-Attractor model (Menn, Schmidt, & Nicholas, 2013): (i) Does the frequency of the input and output forms play a role in the accuracy of a child's ICC articulation? (ii) Does the perceptual salience of the ICC play a role. in the order of acquisition of IC...Â The acquisition of consonant clusters in Polish: a case study. In M. Vihman & T. Keren-Portnoy (eds.) Insertion of Schwa sound before word-initial consonant clusters. Eskate or Skate. T/F: Spanish has fewer consonants in word-final position. True. T/F: In spanish, final consonant clusters are rare. True. You might also like Phonological Processes Definitions. 76 terms. mccarthyl. Phonological Processes- Midwestern University Fallâ€¦ Onset consonant clusters may occur in two or three initial consonants, in which three are referred to as CCC, while coda consonant clusters can occur in two- to four-consonant groups. Common Consonant Clusters. In "The Routledge Dictionary of English Language Studies," author Michael Pearce explains that the written English language contains up to 46 permissible two-item initial consonant clusters, ranging from the common "st" to the less common "sq," but only nine permissible three-item consonant clusters.