

Is there a bias towards a phonetically natural pattern of velar palatalization: Data from an experimental study of Serbo-Croatian

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This paper reports on a set of experiments designed to test the naturalness hypothesis of velar palatalization in different contexts. The hypothesis is based on typological surveys of various languages with velar palatalization (Bhat, 1978; Guion, 1996, 1998) which reveal the same pattern: if a language has palatalization before [e], then it has palatalization before [i], but not necessarily vice versa. Serbo-Croatian (SC) seems to be a counterexample to this typological generalization in certain morpho-syntactic contexts, one of which is the present tense verbal paradigm, the context examined in this paper. In this particular context, SC palatalizes a velar stop [k] to a palatoalveolar affricate [tʃ] before the mid front vowel [e] but fails to do so before the high front vowel [i]. This pattern will be referred to as a marked pattern. Two computer-based experiments were conducted to test whether SC speaking children and adults generalized from the existing pattern of palatalization before the mid vowel [e] to the natural pattern of palatalization before both mid and high vowels.

The first experiment was set in a native language context and tested whether the marked pattern applies only to existing SC verbs or its application extends to new verbs as well. The experiment included 30 subjects, 15 children (7-9 y.) and 15 adults (25-69 y.). The subjects were first presented with a new verb (in infinitive form) and then were asked to choose one from three provided present tense forms. The choice for critical items always included (i) a palatalized form, where the velar [k] followed by the mid or high front vowel was palatalized, as in [hatʃe]; (ii) a non-palatalized form, where the velar [k] followed by the mid or high front vowel was not changed, as in [hake]; and (iii) a control case, where the velar [k] underwent an unattested change, as in [haʎe]. The results revealed differences between the two age groups (($F(1,29)=70.349$, $p<.0001$). The adults unanimously chose forms with palatalization only before the mid vowel (100%) but much less before the high vowel (22%), conforming to the phonetically marked pattern specific to the context in their native language. The children largely chose forms with palatalization before both the mid (98%) and front vowels (90%), showing that they favor the phonetically natural pattern.

The second experiment was an artificial pattern learning experiment, which tested whether SC speakers, who have what seems to be the marked pattern in their native language, favor the phonetically natural one when asked to generalize from a newly learnt pattern to new contexts. The subjects first learned a new pattern of velar palatalization and then were asked to generalize from the impoverished input to new contexts and novel sounds. There were two different exposure groups: one was exposed only to velar palatalization before the mid front vowel [e] (30 subjects; 15 children (7-9 y.), 15 adults (21-64 y.)); and the other one was exposed only to the high front vowel [i] palatalization (30 subjects; 15 children (7-9 y.), 15 adults (21-63 y.)). The experiment was run twice on the same subjects, with the same stimuli in the exposure and the test phase, on two different days and with two different tasks: gap and choice. The choice task included the same three types of choices that were used in the first experiment. The results show no significant difference between age groups ($F(1,59)=0.937$, $p=.337$). The groups exposed to [i] palatalization infrequently generalized palatalization to [e] in both tasks (children palatalized before [e] 13.4% of the time in the gap task, and 20% in the choice; the adults 10.7% in the gap task, and 12% in the choice). The groups exposed to [e] palatalization reveal differences depending on the type of the task. In the gap task, both children and adults rarely palatalized before [i], 18.7% and 4.7% respectively. But in the choice task, both age groups palatalized before [i] frequently (children 80%, adults 96%). The statistical analysis confirmed that there was a significant interaction of vowel and exposure effect ($F(2,58)=803.234$, $p<.0001$) as well as the interaction of vowel, exposure and task ($F(2,58)=207.332$, $p<.0001$).

The first experiment shows that the phonetically marked pattern acts as a bias among adults but not among children in the context of their native language. The second experiment gives evidence that even though SC has the marked pattern of velar palatalization, when the speakers are exposed to a novel pattern ([i] palatalization), they conform to the phonetically natural pattern, i.e. they do not generalize to [e]. But, when a novel pattern interferes with the pattern that exists in their native language ([e] palatalization), the speakers conform to the marked pattern of their native language in a gap task whereas they follow the natural pattern in a choice task. These results strengthen the assumption (Wilson 2006, Moreton 2008, Hayes, Zuraw, Siptár, Londe 2009) that subjects are more likely to choose a phonetically natural form presented to them than to volunteer it.

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