

Trills and palatalization: Consequences for sound change

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It is known that to maintain both trilling and palatalization simultaneously is difficult. First, the raising of the blade and front of the tongue required for palatalization interferes with the aerodynamic conditions necessary for trilling (Ladefoged & Maddieson 1996). Second, palatalization results in the very tip of the tongue and the blade acting more or less like a single solid mass. This reduction of the degree of freedom of the tongue increases the effective mass and resistance of the tongue tip region, while reducing fine control of tension (McGowan 1992). We propose that these articulatory and aerodynamic constraints can be held responsible for the sound changes that involve depalatalization of Proto-Slavic palatalized trilled *r*.

The palatalization of the Proto-Slavic trilled *r* is affected to a different degree in almost all Slavic languages (Carlton 1991). As shown in (1), in most dialects of Belarusian, Slovak, Serbo-Croatian and Macedonian, the palatalization of *r* is altogether lost, while the loss is only partial in Ukrainian, Sorbian, and Bulgarian. In West Slavic, palatalized *r* undergoes spirantization, becoming a trilled fricative in Czech (cf. Czech [r̥eka], Russian [r̥eka] ‘river’) and a fricative in Polish.

The primary characteristic of a trill is the vibration of one speech organ against another, driven by aerodynamic conditions (Maddieson 1989). The aperture size and airflow must fall within critical limits for trilling to occur, and small deviations mean that it will fail (Ladefoged & Maddieson 1996). A trill is not just a series of taps: the tongue body is subject to a higher degree of constraint during the production of trill than of tap (Recasens 1991).

We show that even in Modern Russian, where a full opposition between palatalized and non-palatalized *r* is preserved, the palatalized trill is nevertheless affected: Figure 2 demonstrates that non-palatalized *r* at the beginning of a word is trilled (it usually consists of two taps in normal speech and up to five taps in hyper articulated speech), while the palatalized *r* in the same environment regularly has only one full tap. According to a pilot experiment (the data is from three speakers of Russian), Russian palatalized trills have a greater tendency to undergo ‘detrillization’ than non-palatalized ones. The data provide evidence in support of the claim that palatalized trills have more constraints on their production than non-palatalized ones.

Finally, the spirantization in West Slavic is explained by the fact that physiologically the articulation of a trill is more similar to that of a fricative than to a tap or a flap (Hardcastle 1976). While trilled *r* is palatalized, the tongue tip is lowered, and air passes through the aperture, which is very similar to the one required for fricative articulation. In Polish, palatalized *r* first undergoes spirantization, as in Czech, and then becomes ‘detrilled,’ as in Russian, since tongue blade is too massive to vibrate.

The proposed solution can also help us understand the processes of depalatalization or ‘detrillization’ of trills in some non-Slavic languages, for example, voiced alveolar trill is reduced to a flap before [i] in SePedi, SeSuto, and SeChuana of the Suto-Chuana group of Bantu languages (Tucker 1929).

Data

(1) Reflexes of the Proto-Slavic palatalized trill (adapted from Carlton 1991):

Proto-Slavic	[rʲ]	[r]	Palatalization
Russian	+	[r]	
Belarusian	-	[r]	
Ukrainian	±	[r]	+ still present in all environments
Polish	[ʐ]	[r]	- entirely lost
Czech	[r̩]	[r]	± partially lost
Slovak	-	[r]	
Upper Sorbian	±	[r] or [ʀ]	
Lower Sorbian	+	[r] or [ʀ]	
Slovenian/Slovene	[rj]	[r]	
Serbian/Croatian	-	[r]	
Macedonian	-	[r]	
Bulgarian	±	[r]	

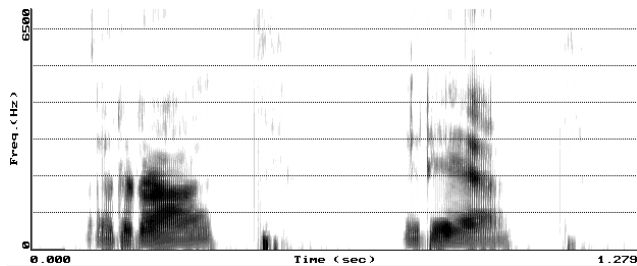


Figure 1. Spectrograms of [rat] 'glad' and [rʲat] 'row'.

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