

Tongue Root Advancement in Palatalization of Russian and Polish Consonants Measured with 3D Ultrasound

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Polish and Russian are closely related languages utilizing similar dimensions of consonantal contrasts (e.g. ‘soft’ vs. ‘hard’), but these dimensions are realized in different ways phonetically. These differences may have implications for phonological representations in the two languages. This study focuses specifically on palatalization contrasts in dental consonants.

With regard to soft consonants, dentals in Russian are obligatorily secondary palatalized before all front vowels (/i/ and /e/), see examples in (1a, b, c). In Polish the pattern differs in three ways: 1) the result of palatalization is not a secondary palatalized dental, but a prepalatal sibilant (‘Coronal Palatalization’), see (1g); 2) coronal palatalization is limited to morpheme boundary contexts; 3) morpheme-internally, only /i/ (but not /e/) will cause an **allophonic** secondary palatalization of the preceding dental (‘surface palatalization’), see (1e, f). In both, Polish and Russian, the contrast in softness exists also in non-alternating forms, independent of the front vowel context, as shown in (1d, h)

(1) Russian		Polish	*Vowel allophony is disregarded
(a) тихий	[tʰixʲ]	(e) tik	[tʰik]
(b) теперь	[tʰepʲerʲ]	(f) teraz	[teras]
(c) мода моде	[mod+a][modʲ+e]	(g) moda – modzie	[mod+a][modz+e]
(d) тётя	[tʰotʲ+a]	(h) ciocia	[tʰote+a]

Soft consonants contrast with hard consonants in both languages, but with realizational differences. For instance, Russian hard consonants are claimed to be velarized in all cases, whereas Polish consonants have been assumed to be much less velarized or not at all velarized.

In this paper, we compare the realization of the two aspects of the soft-hard contrast in both languages. Fig. 1 shows Polish ‘soft’ prepalatal [ɕ] compared with ‘hard’ posterior [ʂ].

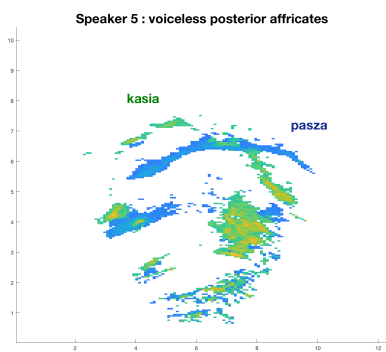


Fig. 1. Polish: hard and soft posteriors compared. Sagittal view (tongue front – left) Soft prepalatals show fronting and raising of the tongue body and substantial fronting of the tongue root. The hard posterior does not show raising of the tongue back typical of velarization.

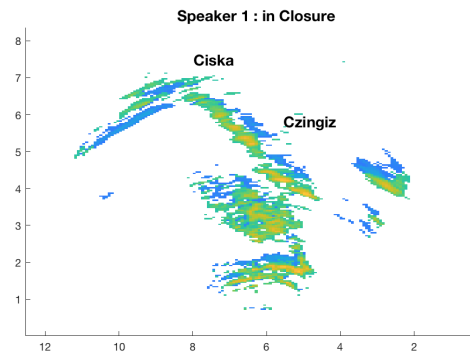
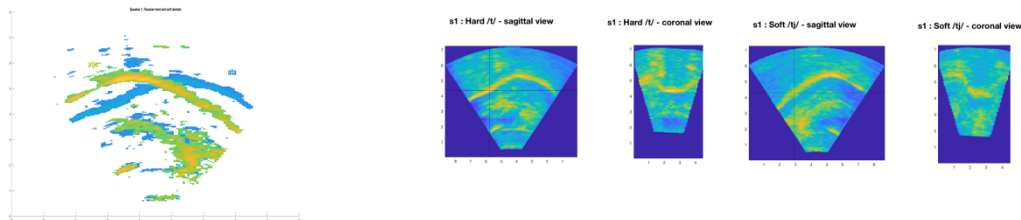
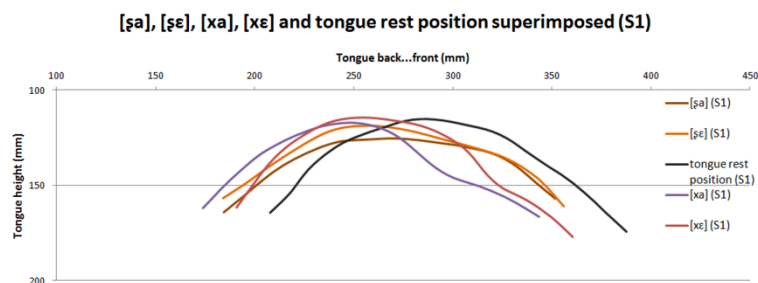


Fig. 2. Polish: soft posterior compared with secondarily palatalized hard posterior. Sagittal view (tongue front – left) Secondarily palatalized ‘hard’ posteriors show only little less raising and fronting of the tongue body, the tongue root is substantially advanced.

The difference between soft and hard consonants is similar in Russian, cf. Figs. 2 & 3. Palatalized sounds are articulated with a substantial advancement of the tongue root, which, we stipulate pushes the tongue body forward and up and thus results in the palatalization of the consonant.



While in Polish hard consonants show no particular velarization, cf. the shape of the hard posterior fricative in ‘pasza’ in Fig. 1, the tongue blade and body are flat, in Russian one can observe the characteristic raising of the back of the tongue, cf. Fig. 4. However, Litvin (2014) observes that “Russian non-palatalized consonants are not pharyngealized in the sense of Esling (1996, 1999, 2005), 2) /l/ and /f/ are uvularized, 3) /s/ and /ʃ/ can feature either uvularization or velarization.” Thus, Russian ‘hard’ consonants are not uniformly velarized. The inspection of the ultrasound tracings in Litvin (2014) allows to conclude that the only common denominator for the ‘hard’ articulation of Russian consonants is the relatively retracted position of the tongue root resulting in either velarization or uvularization.



The investigation of ultrasound images leads us to conclude that the common contrast in Russian and Polish soft vs. hard consonants may be interpreted as a contrast in tongue root position.

Fig. 4. Tongue shape in Russian hard consonants (Litvin 2014:125)

References

Litvin, Natallia. 2014. An Ultrasound Investigation of Secondary Velarization in Russian. MA: U. of Victoria.