Russian palatalization as incomplete neutralization

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Background

1. Incomplete neutralization

Incomplete neutralization: Small but significant phonetic traces of underlying contrasts for phonologically "neutralized" contrasts

2. Russian palatalization

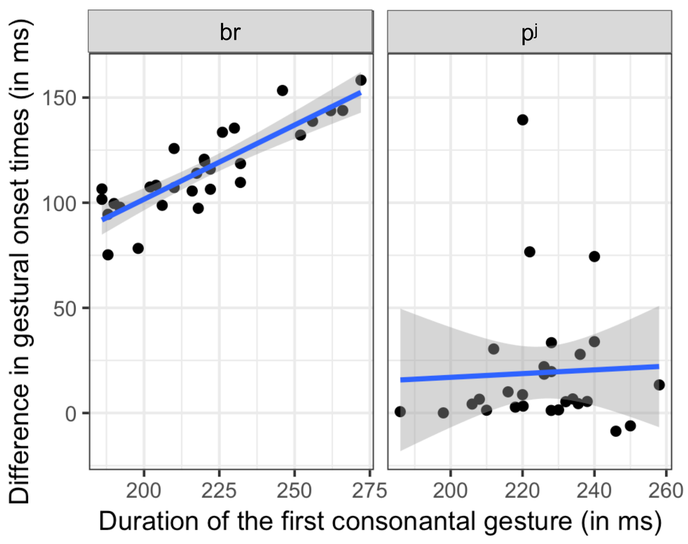
- Plain vs. Palatalized consonants, e.g. /l/ vs. /lʲ/
- The plain-palatalized contrast is neutralized due to /j/ -palatalization: /Cj/ --> [Cʲj].

Palatalized consonants (UNDERLYING condition)	Plain C-glide sequences (DERIVED condition)
/l̲jut/->[lʲut] 'fierce'	/ljut/ -> [l̲jut] 'pour (3p pl).'

- "Plain" consonants possibly have a secondary velar/ uvular articulation (Litvin, 2014; Roon & Whalen, 2019; Skalozub, 1963)

3. The temporal coordination (Shaw at al., 2019)

- **Segment sequence timing:** the onset of G2 is coordinated with the offset of G1
- **Complex segment timing:** the onset of G2 is coordinated with the onset of G1



4. Predictions

	Temporal coordination	Other spatial & temporal measures
Complete neutralization	No difference	No difference
In-complete neutralization	No difference	Small but significant difference
No-neutralization	Significant difference	Significant difference

Methods

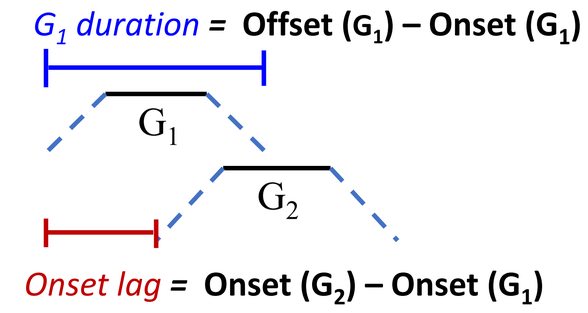
1. Participants & Speech materials

- 4 Russian native speakers participated in an EMA experiment
- 15-30 repetitions of each word in a carrier phrase

Palatalized consonants (UNDERLYING condition)		Plain C-glide sequences (DERIVED condition)	
/pʲok/	bake (3ps past)	/pjot/	drink (3ps pres)
/bʲust/	bust (breast/sculpture)	/bjut/	beat (3pp pres)
/mʲu/	Greek letter	/mju/	a Pokemon name
/fʲodor/	Fyodor (name)	/fjord/	fjord
/vʲoz/	carry (3ps past)	/vjoʂ/	weave (2ps pres)
/vʲodra/	bucket (pl)	/vjotsa/	weave (3ps pres refl)

2. Measurements

- Lip aperture for labial gesture; Tongue blade for /j/
- The correlation between *first gesture duration* and *onset lag*
- The spatial position of the TB sensors at movement onset



Results

1. Temporal coordination

- The effect of *first gesture duration* on *onset lag* was not different for UNDERLYING vs. DERIVED conditions.

⇒ The DERIVED palatalization has the same pattern of temporal coordination as the UNDERLYING palatalization.

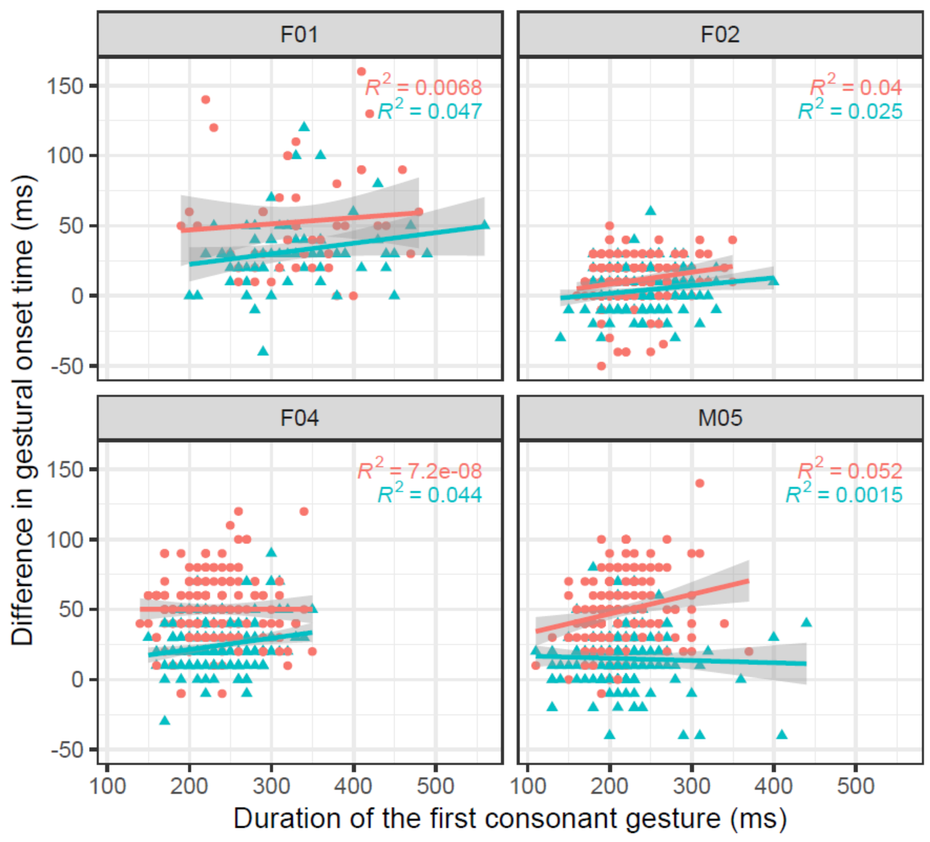


Fig. 1. The correlation between first gesture duration (x-axis) and onset lag (y-axis) across conditions for each speaker

Table 1. LME Model comparisons for the interaction

Onset lag	DF	AIC	LogLik	Chisq	Pr(>Chisq)
1 +(1|speaker) +(1| item)	4	10182	-5086.9	NA	NA
1+consonant duration +(1|speaker) + (1| item)	5	10162	-5076.2	21.319	< 0.001 ***
1+consonant duration +status+(1|speaker) + (1| item)	6	10138	-5063.2	26.075	< 0.001 ***
1+consonant duration *status+(1|speaker) + (1| item)	7	10140	-5063.1	0.2308	0.631

2. Articulatory evidence of incomplete neutralization

- The spatial position of the TB is significantly more retracted for the DERIVED condition than for the UNDERLYING condition at the onset of the palatal gesture.

  => consistent with the presence of a secondary tongue dorsum retraction gesture for plain stops.
- The lag between the gesture onsets was significantly longer for the DERIVED condition than for the UNDERLYING condition.

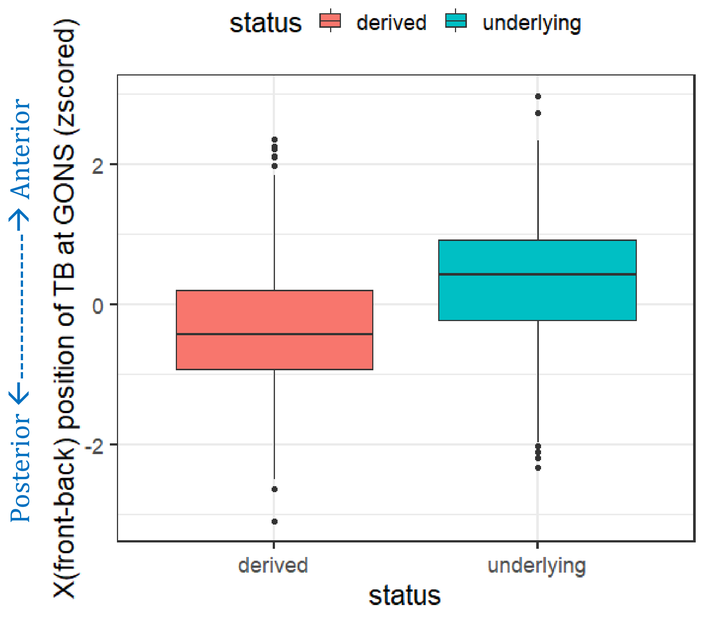


Fig. 2. normalized horizontal position (front-back) of the TB sensors at the gestural onset across conditions

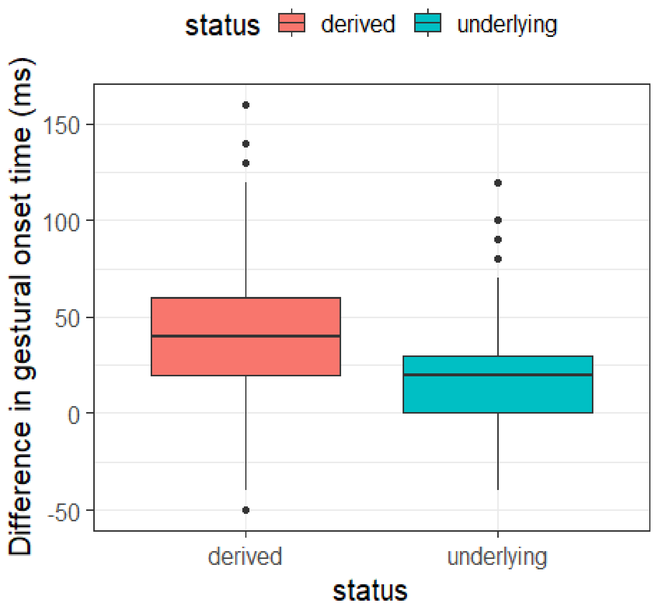


Fig. 3. A box plot of onset lag across conditions

Table 2. LME Model comparisons for TB

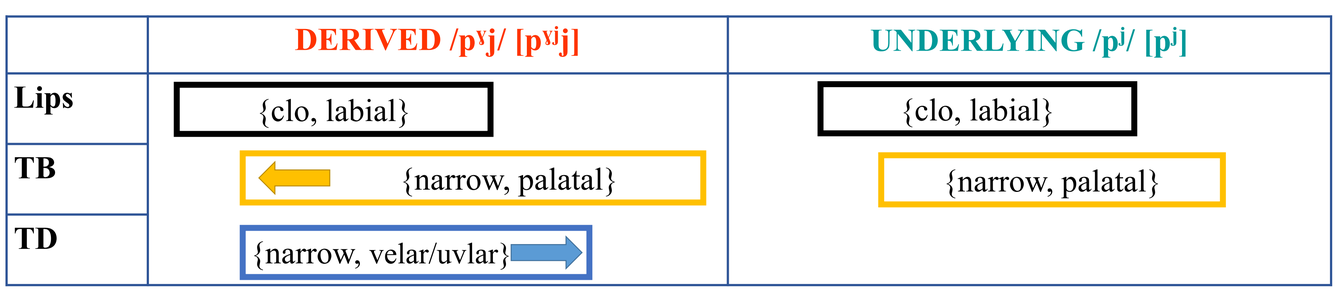
TB	DF	AIC	LogLik	Chisq	Pr(>Chisq)
1 +(1|speaker) + (1| sequence)	4	3016.2	-1504.1	NA	NA
1+status +(1|speaker) + (1| sequence)	5	3000.3	-1495.2	17.84	< 0.001 ***

Table 3. LME Model comparisons for onset lag

Onset lag	DF	AIC	LogLik	Chisq	Pr(>Chisq)
1 +(1|speaker) + (1| sequence)	4	10182	-5086.9	NA	NA
1+status +(1|speaker) + (1| sequence)	5	10158	-5074.1	25.551	< 0.001 ***

Discussion & Conclusion

- Gestures in both conditions are coordinated as complex segments.
  => The contrast between palatalized and plain consonants is neutralized in this context.
- Evidence of small but significant underlying distinctions: more retracted TB & the increased Onset lag for the DERIVED condition => The neutralization is incomplete



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