THE EDGE TONES INVENTORY IN STANDARD RUSSIAN PROSODY: ARE PHRASE ACCENTS REQUIRED?

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ABSTRACT

This paper discusses the structure and inventory of edge tones in the intonational phonology of Standard Russian. Based on the qualitative analysis of four Russian tunes elicited in experimental conditions, we argue that the position of postnuclear pitch targets in these tonal configurations can be better modelled if the notion of phrase accent is employed. Three configurations of edge tones are discussed: H-L%, H-H% and L-L%. According to the data, Russian phrase accents tend to demonstrate boundary-seeking behaviour when a long postnuclear stretch of syllables is available. Either edge tone truncation or vowel lengthening are attested when postnuclear segmental material is lacking. The choice of tune-text negotiation strategy is presumably determined by the need to preserve distinctive pragmatic meaning (in the case of H-L%) and by the alignment within the nucleus (in the case of L-L%).

Keywords: intonation, autosegmental metrical model, phrase accent, truncation, Russian

1. INTRODUCTION

A comprehensive prosodic description of a given language within the autosegmental metrical (AM) model of intonation should define the tones associated with constituent heads (*pitch accents*) and those associated with phrasal boundaries (*boundary tones* and *phrase accents*, collectively known as *edge tones*) [1, p. 28]. Although the need to include phrase accents in the analyses of well-studied prosodic systems has been debated extensively in the literature [2]–[4], the edge tones inventory for Standard Russian remains largely underdiscussed. Previous AM-based studies of Russian have predominantly remained agnostic regarding the issue and either included the default phrase accents identical to boundary tones in their labelling systems [5], [6] or excluded phrase accents altogether due to the lack of empirical evidence for their presence in Russian [7]. One particularly explicit approach to this issue is present in Odé's proposal for labelling Russian intonation, which posits no phrase accent in Russian and the sole L% boundary tone contrasted with the boundary not marked by pitch [8]; that is, in Odé's model the nuclear pitch level is treated as a default for the postnuclear stretch.

One source of such a lack of attention to the Russian edge tones inventory is the paucity of common tunes containing non-prominence-lending postnuclear changes in pitch. In most frequent Russian tonal configurations, the level of the final nuclear tonal target of the phrase is sustained throughout the postnuclear string. Additionally, until recently, no tunes were attested in Standard Russian containing a pitch turning point aligned with the phrase-final unstressed syllable (a typologically common manifestation of boundary tones associated with the final syllable of intonation phrase; IP).

In this paper, we analyse four Russian tonal configurations contradicting the general tendency to sustain the nuclear pitch level throughout the postnuclear string. This exploratory study aims to address three main research questions:

1) Can all postnuclear pitch movements in Russian be modelled by straightforward interpolation from the nuclear level to the level of the IP-final syllable?

2) Do postnuclear turning points in Russian demonstrate boundary-seeking or stress-seeking behaviour typical of the phrase accents?

3) How do postnuclear pitch events adjust under the time pressure in the vicinity of the IP boundary?

These questions are addressed below based on the data recorded under experimental conditions.

2. DATA COLLECTION

The data presented in this paper were elicited from 12 native Russian speakers (nine female, three male, mean age 26.3). Most were exchange students or temporary visitors at Ca' Foscari University of Venice, except for one speaker who had resided in Venice for four years but lives in a Russian family and exclusively speaks Russian at home.

The elicitation procedure included reading aloud short reactions (2–3 phrases) to contextualised situations. The participants were permitted to familiarise themselves with the contexts and the stimuli before reproducing them. Four different tunes were elicited, corresponding to the pragmatic meanings presented below in sections 3.1–3.4.

In addition to the contexts, the syllabic structure of stimuli was manipulated to observe the tune-text

negotiation strategies employed by the speakers in the vicinity of the IP boundary (see Table 1). The three syllabic conditions are hereafter referred to as 6S (6 postnuclear syllables), 2S (two postnuclear syllables) and 0S (no postnuclear syllables; the syllable bearing nuclear prominence is IP-final), respectively.

Stimuli (polar question, see sect. 3.3)	Syllables
(1) *I Golovanovu uvolili?* 'And Golovanova-Acc. they fired?'	6
(2) *I Golovanovu?* 'And Golovanova-Acc. (they fired)?'	2
(3) *I golova?* 'And (your) head (hurts)?'	0

Table 1: The syllabic structure of the elicited stimuli; the number of syllables following the nuclear accent is indicated in the right column. Golovanova (with the third syllable stressed) is a common Russian surname.

Four repetitions of each stimulus in each condition were elicited to ensure that the speakers produced the contours consistently. Only the first repetitions of the stimuli are discussed in this paper. A total of 144 tokens (12 speakers, four contexts and three syllabic conditions) were segmented and labelled manually in *Praat* [9]; all contours, both original and time-normalised in [10], were inspected visually to address the research questions.

3. RESULTS AND DISCUSSION

3.1 The qualitative implicature tonal configuration

The first tonal configuration discussed here is that of a pragmatically loaded statement:

(1) *Ne tol'ko melkikh soshek uvol'nyayut. I Golovanovu uvolili!* 'It's not that they only fire small fry. Golovanova was fired, too'.

When produced with a complex rising-falling-rising contour, this phrase conveys a qualitative implicature regarding the person named Golovanova. The listener is not merely informed of the fact that this individual was fired but also that they are not expected to be treated this way. This uncommon tune was mentioned in [11] and first studied experimentally in [12]. An example of its typical phonetic realisation is given in Fig. 1: under the 6S condition (*left*), when a long string of postnuclear segments is available, the nuclear pitch accent (preliminarily labelled here as H+L*) is followed by a high plateau starting at the right boundary of the prominent word. The plateau spans the prestressed string of syllables in the IP's final word and is followed by an abrupt fall aligned with the IP's last metrically strong syllable.

One interpretation of this non-prominent falling pitch movement could be a separate postnuclear pitch accent assigned to the phrase-final verb *uvolili*. However, the data elicited under the 2S and 0S conditions indicates that the postnuclear plateau and the fall are preserved even when the IP's final word or syllable bears the H+L* nuclear accent (Fig. 1, *centre* and *right*). We suggest that the observed postnuclear pitch movements can be analysed as a combination of a boundary tone L% preceded by a phrase accent H-. Instead of being associated with singular targets, both edge tones show signs of secondary association. In 6S, the L% is spread/copied from the phrase boundary in all post-stressed syllables of the IP-final word. Conversely, the H- is associated with the last metrically strong syllable of the IP and spread/copied to the preceding syllables up to the right boundary of the nuclear-accented word. When nuclear prominence is assigned to the final word or syllable in the IP (2S and 0S, respectively), both edge tones are aligned with the IP-final syllable. Importantly, in the 0S condition, the edge tones cannot be truncated because, in this case, the contour becomes homophonous to the regular narrow focus statement H+L* (L-L%) and thus loses the distinctive qualitative implicature. The need to fit three tones in a single syllable is met by vowel lengthening.

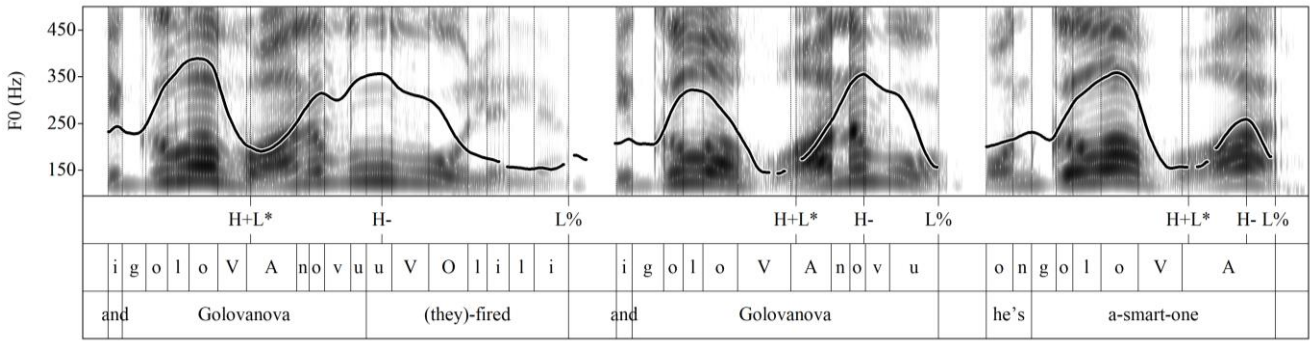

Figure 1: Pitch contours of the qualitative implicature tune produced by speaker 9 in three conditions: 6S (*left*), 2S (*centre*) and 0S (*right*). The tokens were recorded separately and further concatenated in *Praat* for ease of presentation. The segments within the stressed syllables are shown in uppercase.

3.2 The comparative question tonal configuration

A logical comparison to the tune presented in 3.1 is the comparative question contour, labelled IK-4 (*fourth intonational construction*) in Bryzgunova's traditional description of Russian intonation [13]:

(2) *Tak, ty otdala svoy klyuch Ivanovu. A Golovanova komu dala?* 'So, you gave your key to Ivanov. And Golovanova to whom gave [it]?'

Within the AM framework, the IK-4 nuclear accent is usually analysed as monotonal L*; the optional high target preceding the L* is interpreted as an independent prenuclear H* since it can be aligned several syllables before the nucleus. The comparative question contour is the only Russian tune that has been specifically studied concerning postnuclear pitch movements. Knyazev and Savelieva [14] reported a large variability of apparently different postnuclear movements in IK-4, including a gradual rise in pitch to the IP-final syllable and a high plateau reached a few syllables earlier. It should be noted, however, that their study only controlled for the total number of postnuclear syllables, while the effects arising from the presence of a word boundary in the postnuclear string were not investigated separately.

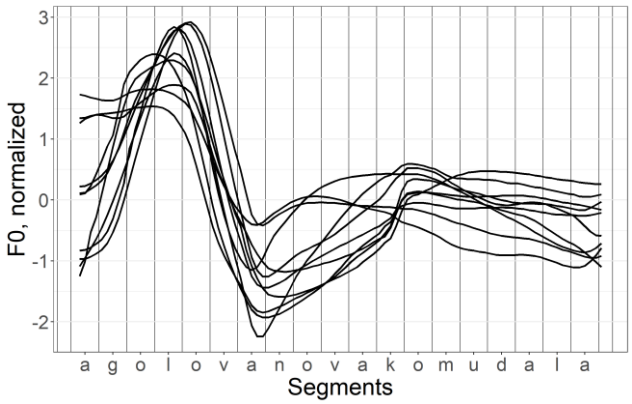

Figure 2: Time-normalised contours of comparative questions produced under the 6S condition ('*And Golovanova to whom gave (it)?*').

Our data reveals that the subjects produced long postnuclear strings more consistently than the speakers in [14]. As the time-normalised contours in Fig. 2 demonstrate, the postnuclear elbow was most frequently aligned with the voiced onset of the first postnuclear constituent *komu*, 'to whom', followed by a high plateau. Rarely the pitch maximum was reached immediately after the syllable bearing the NA, and, importantly, no instances of gradual pitch rise to the IP-final syllable were attested. That is, the high tonal target at the beginning of the postnuclear plateau demonstrates boundary-seeking behaviour similar to the behaviour of H- reported in 3.1. By analogy with 3.1, we suggest that this edge configuration can be analysed as a combination of H- and H%, with the same patterns of secondary association for both phrasal and boundary tones as those proposed for H- and L% in 3.1.

Under the 2S condition, the pitch targets for both H- and H% are aligned with the IP-final syllable. As for the 0S, the vowel lengthening strategy was employed by most speakers to fit the pitch accent L* and the edge configuration H-H% within the phrase-final syllable, a known feature of IK-4 [13].

3.3 The polar question tonal configuration

In 3.1 and 3.2, two tonal configurations containing postnuclear high targets were discussed. However, the prosodic inventory of Russian includes a frequent tune with the opposite type of pitch movement: a nuclear accent culminating at a high level and followed by a postnuclear low target. This tonal configuration is the default tune marking yes/no questions in Russian. After the nuclear L*+H, the low tone is reached early in the postnuclear syllable string and is sustained until the end of the IP.

This pattern bears similarity to the English H* L-L% that originally served as a primary argument supporting the necessity of an additional level of edge tones in the prosodic phonology of this language [15]. Likewise, in Russian polar questions, postnuclear pitch movements cannot be modelled by mere interpolation from the nuclear H to the boundary L% (see Fig. 3, *left*). Before quantitative results are available, we limit ourselves to pointing out that if it is found that the elbows observed in long postnuclear syllable strings do demonstrate a tendency to align with the right edge of the nuclear word, this can be taken as a further argument in favour of analysing edge configuration in Russian yes/no questions as containing two separate elements: L- and L%.

3.4 The mirative corrective focus tonal configuration

The final part of this section presents one more postnuclear falling movement that has not been previously studied experimentally:

(3) *Akh vot ono chto! Akh Golovanovu uvolili! A ya-to dumal, chto Ivanova...* 'Oh, that's how it is! Oh, [it was] Golovanova who was fired! I thought it was Ivanov…'.

In this corrective focus statement (3), in addition to the standard focal information about the incorrectness of the alternatives (normally marked by the H+L*pitch accent [16]), the pragmatic meaning of incredulity can be expressed in Russian using the monotonal H* nuclear accent. Although the resulting tonal configuration bears similarity to the polar question tune in 3.3, the two tunes demonstrate consistent differences in the placement of prenuclear

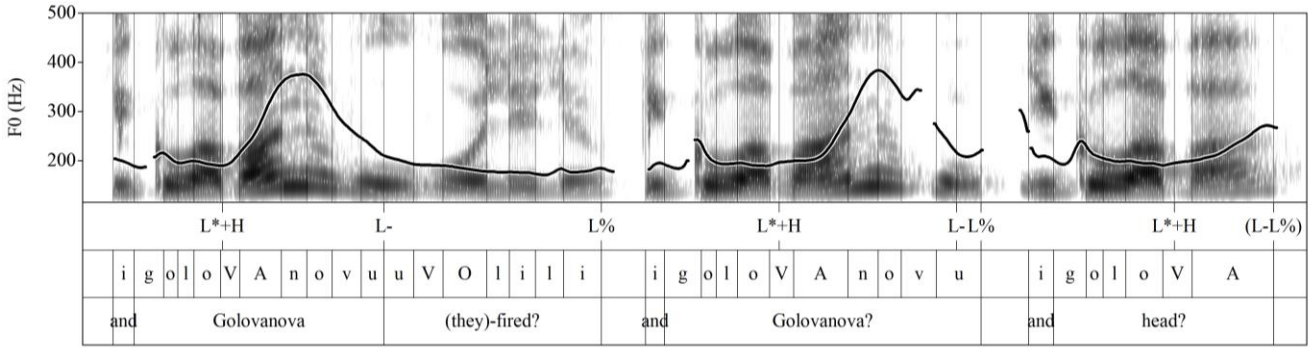

Figure 3: Pitch contours of polar questions produced by speaker 4. The truncated edge tones are shown in brackets.

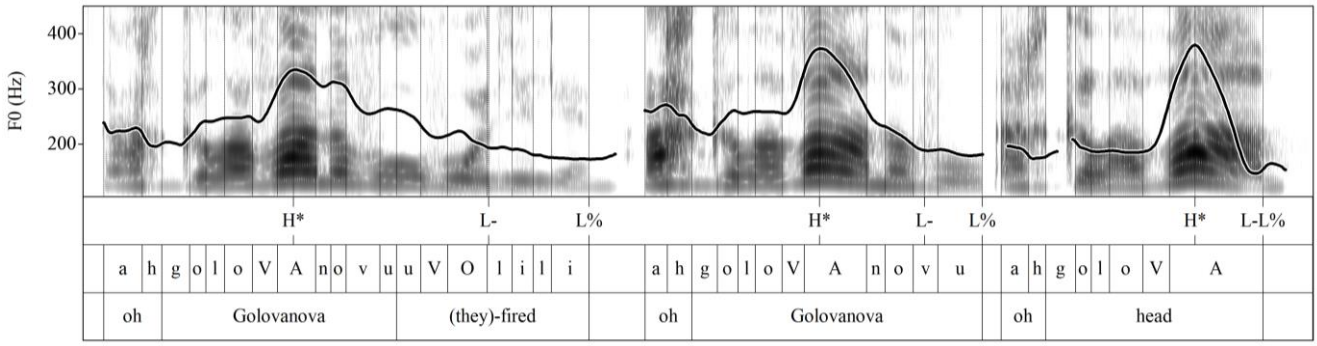

Figure 4: Pitch contours of mirative corrective focus statements produced by speaker 2.

and nuclear pitch targets (Fig. 4). First, the mirative corrective focus nucleus lacks an obligatory low nuclear target (the pitch can rise gradually from the base tone to the H* throughout the prenuclear syllable stretch, without a low dip in the onset of the nucleus considered a typical feature of L*+H). Second, the peak for H* is aligned with the centre of the stressed syllable, while L*+H is produced with peak delay.

Regarding the postnuclear movements, the alignment of the low elbow in mirative corrective focus statements was less consistent than in the polar question tune. For some subjects, such as speaker 2 (see Fig. 4. *left*), no boundary-seeking behaviour of the phrase accent was attested, while for several subjects, the postnuclear part of the contour was identical to that attested in 3.3 for polar questions.

Finally, one difference between the realisation of edge configurations in 3.3 and 3.4 was highly consistent in our data. Two different strategies were employed for the nuclear L*+H and H* under the 0S condition. On the one hand, in polar questions (Fig. 3, *right*), a categorical truncation of postnuclear tones, a documented feature of Russian prosody [7], was observed consistently. On the other hand, in the mirative corrective focus tune, no truncation was attested (Fig. 4, *right*); the nuclear H* and the low target fitted within the lengthened IP-final stressed vowel. These differences can be explained by the earlier alignment of a high nuclear target in the mirative H* compared to the delayed target for the trailing high tone in L*+H.

4. CONCLUSIONS

In this exploratory study, four Russian tonal configurations containing non-prominence-lending postnuclear tonal movements were briefly presented. Based on preliminary qualitative analysis of these tunes, elicited from 12 speakers, we argue that having two distinct levels of edge tones (the phrase accent, in addition to the boundary tone level) allows us to more faithfully model the features of postnuclear pitch movements attested in Russian. First and foremost, a phrase accent differing from the boundary tone helps capture the complex structure of the qualitative implicature tune. In addition, the tendencies observed in the alignment of elbows in polar and comparative question tunes can be approached successfully using the mechanisms of secondary association typical of phrase accents.

One issue not addressed in this paper is the metrical structure implications of employing phrase accents in Russian. Since [17], AM-based analyses often assign a secondary delimitative function to phrase accents: the role of a terminal tone within the intermediate phrase. Quantitative studies are required to clarify this issue for Russian; however, if they confirm the word-boundary-seeking tendencies of Russian phrase accents, including a level of phrasing lower than the IP in the prosodic phonology of this language would be a natural corollary.

5. REFERENCES

[1] A. Arvaniti, “The autosegmental metrical model of intonational phonology,” in *Prosodic Theory and Practice*, S. Shattuck-Hufnagel and J. Barnes, Eds. MIT Press, 2022, pp. 25–63.

[2] M. Grice, D. R. Ladd, and A. Arvaniti, “On the Place of Phrase Accents in Intonational Phonology,” *Phonology*, vol. 17, no. 2, pp. 143–185, 2000.

[3] C. Gussenhoven, “The boundary tones are coming: On the nonperipheral realization of boundary tones,” in *Papers in Laboratory Phonology V: Acquisition and the lexicon*, M. B. Broe and J. B. Pierrehumbert, Eds. Cambridge University Press, 2000, pp. 132–151.

[4] J. Barnes, N. Veilleux, A. Brugos, and S. Shattuck-Hufnagel, “Turning points, tonal targets, and the English L- phrase accent,” *Lang. Cogn. Process.*, vol. 25, no. 7–9, pp. 982–1023, 2010.

[5] Y. Igarashi, “Russian Interrogatives and Intonational Categories,” in *The Discourse Potential of Underspecified Structures*, A. Steube, Ed. De Gruyter, 2009, pp. 227–270.

[6] P. V. Duryagin, “Intonacija častnogo voprosa v russkom jazyke: èksperimental′noe issledovanie istočnikov variativnosti,” *Rus. Jaz. v naučnom osveščenii*, vol. 41, no. 1, pp. 137–177, 2021.

[7] T. Rathcke, “How Truncating Are ‘Truncating Languages’? Evidence from Russian and German,” *Phonetica*, vol. 73, no. 3–4, pp. 194–228, 2017.

[8] C. Odé, “Transcription of Russian intonation ToRI, an interactive research tool and learning module on the internet,” *Stud. Slav. Gen. Linguist.*, no. 34, pp. 431–449, 2008.

[9] P. Boersma and D. Weenink, “Praat: doing phonetics by computer.” 2022.

[10] P. Arantes, “parantes/time-normalized-f0: Version 2.0 of time-normalized-f0 Praat script.” 2022.

[11] S. V. Kodzasov, *Issledovanija v oblasti russkoj prosodii*. Moscow: Jazyki slavjanskix kul′tur, 2009.

[12] P. V. Duryagin, “Prosodija konstrukcij «Èto/zdes′/tut tebe/vam ne X»: opyt èlicitacii dannyx metodom imitacii fragmentov mul′timedijnogo korpusa,” in *Analiz razgovornoj russkoj reči (AR3-2021): Trudy devjatogo meždisciplinarnogo seminara*, D. A. Kočarov and P. A. Skrelin, Eds. Saint Petersburg: Skifija-print, 2021, pp. 24–30.

[13] E. A. Bryzgunova, “Intonacija,” in *Russkaja grammatika, Vol. I*, N. Švedova, Ed. Nauka, 1980, pp. 96–120.

[14] S. V. Knyazev and K. A. Savelyeva, “Fonetičeskoe i fonologičeskoe opisanie v intonacii (IK-4 v russkom jazyke: postcentr ili pograničnyj ton?),” *Rus. Jaz. v naučnom osveščenii*, vol. 2, pp. 41–64, 2021.

[15] J. B. Pierrehumbert, “The phonology and phonetics of English intonation,” MIT, 1980.

[16] P. Duryagin and S. Knyazev, “Prosodic diversity in Standard Russian: pitch alignment in Central and Northern varieties,” *Russ. Linguist.*, vol. 46, no. 2, pp. 55–75, 2022.

[17] M. E. Beckman and J. B. Pierrehumbert, “Intonational structure in Japanese and English,” *Phonol. Yearb.*, vol. 3, pp. 255–309, 1986.