Phonology **23** (2006) 125–156. © 2006 Cambridge University Press
doi:10.1017/S0952675706000868 Printed in the United Kingdom

*Stress and tone in East Slavic dialects**

Christina Y. Bethin
Stony Brook University

The East Slavic languages have distinctive stress and no contrastive vowel length; the phonetic correlates of word stress are increased vowel duration, intensity and changes in vowel quality. But there are East Slavic dialects with an unusual type of word prosody: word stress is distinctive, yet the immediately pretonic vowel is as long as or longer than the vowel under stress, and there is a fixed tonal contour over the two syllables. I argue that the additional duration in the pretonic syllable is due to a type of stress-to-tone mapping in which a lexical high tone is assigned to the pretonic syllable. Variation across these and other closely related dialects reveals a typology of stress and tone mapping with increasing dependence on intrinsic vowel duration and sonority. The additional vowel length on neutralised/reduced vowels in the immediately pretonic position in some dialects raises questions about the relationship of vowel duration and vowel reduction in East Slavic. The prosody of these East Slavic dialects appears to be typologically unusual in having both lexical stress and non-contrastive tone, and in specifically not aligning high tone with stress.

1 Introduction

The East Slavic languages, Belarusian, Russian and Ukrainian, in contrast to West and most of South Slavic, are widely recognised as having distinctive lexical stress: Belarusian /ˈmuzɨka/ 'music', /muˈzɨka/ 'musician', /staˈlɨ/ 'tables', /ˈstalɨ/ 'mature'; Ukrainian /ˈzamok/ 'castle', /zaˈmok/ 'lock', /voˈdɨ/ 'water (GEN SG), /ˈvodɨ/ 'water (NOM PL). Vowel length is not contrastive, and the primary phonetic correlates of stress in the standard languages are duration and vowel quality (Zlatoustova 1954, 1981: 13–20, Bondarko *et al*. 1966, Bondarko 1977, Toc'ka 1969: 127–130, 1970: 23, Brovčenko 1969, Matusevič 1976: 223–28, Kuznetsov *et al*. 1987). But within this East Slavic linguistic area are dialects with an unusual type of

* I would like to thank John Alderete, Mark Aronoff, Ellen Broselow, Marie Huffman, Darya Kavitskaya, Jaye Padgett and audiences at *FASL 13, AATSEEL Annual Meetings*, the *Yale University Linguistics Colloquium* and Stony Brook University for thoughtful questions and comments on an earlier version of this work. I am also grateful to the guest editors of this thematic issue and to Bob Ladd and the journal editors for detailed and helpful guidance. The extensive comments of three anonymous reviewers significantly contributed to the improvement of the paper. Any remaining shortcomings are mine.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

word prosody: word stress is distinctive, but the immediately pretonic syllable is as long as or longer than the stressed syllable (i.e. CVCV:ˈCV:). This pretonic length is accompanied by a fixed rising-falling pitch contour. The unusual prosody of 'pretonic length' dialects has long been recognised in the literature (Broch 1916, Kurylo 1924, Avanesov 1927, Zaxarova 1970, Vajtovič 1972, Čekmonas 1987 and others) and reported in dialect atlases (Avanesov 1957, *DABM* 1963, *AUM* 1984–88, *DARʒa* 1986). More recent instrumental work (Bila 1970, 1974, Al'muxamedova 1985, Al'muxamedova & Kul'šaripova 1980, Kasatkina 1996a, b and others) confirms significant duration (and intensity) of the immediately pretonic vowel, but does not, as a rule, offer any explanation.

The 'pretonic length' dialects exhibit one of two patterns: (i) the duration in the immediately pretonic syllable is *independent* of the quality of the stressed vowel (the archaic Vladimir-Volga Basin dialect type (Type 1)); (ii) duration in the immediately pretonic position is *dependent* on the quality of the stressed vowel (the Malyja Aucjuki/Upper Snov Basin dialect type (Type 2)). Fieldworkers have consistently characterised speakers of these 'pretonic length' dialects as having a protracted, sing-song way of speaking, with a rising pitch on the immediately pretonic syllable, followed by a pitch fall on the stressed vowel (Vajtovič 1972: 27). In Type 1 dialects, the realisation of the fixed rising-falling pitch contour is *independent* of the quality of the vowel under stress, while in Type 2 dialects it is *dependent* on the quality of the stressed vowel. Some of these dialects neutralise the contrast between /ɔ/, /o/ and /a/ in immediately pretonic position, a type of vowel reduction known in the Russian linguistic literature as *akan'e* (after a non-palatalised consonant) and *jakan'e* (after a palatalised consonant). In dialects with *akan'e*/*jakan'e*, this neutralised vowel is also long pretonically. The existence of lengthened neutralised or reduced vowels appears to contradict durationally based functional explanations of vowel neutralisation/reduction, so these dialects present an interesting problem.

The word prosody of 'pretonic length' dialects stands out in several respects that are of interest for current theories of prosody: (i) the presence of systematic phonetic duration outside the stressed syllable, yet controlled by it, bears on the phonetic mapping of stress and the expression of word prominence; (ii) the presence of a tonal contour on the syllable immediately preceding lexical stress raises questions about the relationship between stress and tone; (iii) dialects where the duration of the immediately pretonic vowel depends on the quality of the stressed vowel attest to the role of intrinsic phonetic duration in the expression of prominence; and (iv) the presence of additional vowel duration in syllables which also exhibit vowel neutralisation or reduction (*akan'e*/*jakan'e*) raises questions about the relationship between duration and vowel reduction. As there has been virtually no discussion of this type of prosody in the general linguistic literature, the data are of typological interest as well.

The proposal is that these dialects have both stress and tone. Stress is contrastive, and high tone is assigned to the syllable immediately

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

before the stress. The accommodation of a full pitch rise to the pitch peak in the immediately pretonic syllable requires additional duration in that syllable. The 'pretonic length' dialects differ in how much of the tonal contour is mapped onto the pretonic syllable, but in all the dialects to be discussed the stressed syllable is marked by a falling or low tone. Variation across these and other closely related dialects reveals a typology of increasing dependence between the phonology and phonetics, as the phonetic implementation of the tonal contour becomes more and more constrained by the intrinsic duration of the sounds associated with it.

Many of these East Slavic dialects show strong vowel reduction to [ə] in unstressed positions outside the immediately pretonic, and in this respect they are like other stress-based systems where duration and intensity are correlates of stress (Beckman 1986). But here we also find notable duration and intensity in the immediately pretonic syllable. This position has been identified as having special status in a wide range of other Belarusian and Russian dialects, including the standard languages, and this has been formally represented in terms of iambic metrical footing (Crosswhite 1999, Barnes 2002) in accounting for different patterns of vowel reduction. But it is not clear that the special status of the immediately pretonic position in these dialects is necessarily due to iambic parsing. In 'pretonic length' dialects, the prosodic prominence of the immediately pretonic position is most likely an effect of a pitch peak in that syllable.

The paper is organised as follows: §2 introduces the relevant data from three representative East Slavic dialects. Dialects with pretonic length and a tonal contour before all stressed vowels are discussed in §2.1. Dialects with an alternation in pretonic length and pitch contour that depends on the nature of the vowel under stress are discussed in §2.2, where the two types, with and without vowel neutralisation in immediately pretonic position, are introduced. §3 discusses how stress and tone interact with vowel quality in these and related dialects. A typological comparison with Neo-Štokavian dialects of Serbian and Croatian and with Stockholm Swedish is given in §4. §5 addresses the relationship between pretonic lengthening and vowel neutralisation. Directions for future research and conclusions are in §6.

2 Dialects with length and a pitch contour on the immediately pretonic syllable

Descriptions of the 'pretonic length' dialects are consistent in noting increased duration and a rising or rising-falling pitch contour in the immediately pretonic syllable and a falling or low pitch on the stressed syllable. The available instrumental studies focus on measurements of duration and intensity, and these results are discussed in detail below. Information about the tonal contour of these dialects comes primarily from fieldwork descriptions, and some pitch-track data are available for closely related dialects.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

Working in the region of Nižnij Novgorod (Vladimir-Volga Basin (Type 1) dialect area), Durnovo (1914: 373) remarked that 'the majority of dialects is distinguished by a special intonation: the pretonic syllable is pronounced with a strong rise in pitch, which gives the impression of two stresses in the word'.[1] Avanesov (1927: 68) observes that in the dialect of Pereslavl'-Zalesski in the Vladimir-Volga Basin group 'the pretonic syllable is significantly elongated, receives a special expiratory weight and, in addition, it is pronounced with a marked rise in pitch. The greatest pitch rise occurs at the beginning of the syllable, and then, inside the syllable, there is a lowering of pitch'. Vysotskij (1973: 35) remarks that these dialects, together with the Old Moscow dialect type, are characterised by a smooth increase in the strength curve of the pretonic syllable. Vajtovič (1972: 19) writes that 'pretonic /ɔ/ usually preserves its quality, is pronounced protractedly, as if singing … with a raising of the voice pitch at the beginning of the syllable followed by its fall (giving the impression of a rising–falling intonation on the pretonic vowel). In the syllable corresponding to the stressed syllable in the literary language, the pitch lowers even more, as if falling off sharply'.

Although additional duration in the immediately pretonic position has been widely reported in both types of dialects, the Vladimir-Volga Basin and the Malyja Aucjuki/Upper Snov Basin types, there is little information or speculation about the possible reasons for this phenomenon. Kasatkina (1996b) observes that Russian dialects differ among themselves in the general nature of their word prosody or rhythm. She classifies the Central Russian dialect area (which includes the Vladimir-Volga Basin dialects as well as the standard language) as having 'a strong centre and weak periphery', in that the immediately pretonic syllable – as distinct from other unstressed positions – is more prominent either by duration or by the absence of vowel neutralisation or by both. Other unstressed positions, both pretonic and posttonic, are subject to strong vowel reduction and sometimes complete vowel loss. Little is said about the pitch contour so often remarked upon by fieldworkers.

2.1 Type 1: pretonic length independent of stressed vowel quality

The Russian dialects located around the city of Vladimir and to the southeast near Murom constitute the central part of the larger Vladimir-Volga Basin dialect group, which itself lies within the larger Central Russian dialect area (area 1 on the map in Fig. 1). Together with the Pereslavl'-Zalesski dialects to the northeast of Vladimir, these dialects with a long and continuous settlement history are considered to be among the more archaic dialects of Russian (Zaxarova 1970). For the most part, they have five vowels under stress, /i, u, e, o, a/, though a few maintain some distinction between etymologically long and short /e/, and there are

[1] All translations in quotations from Slavic languages are the author's.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

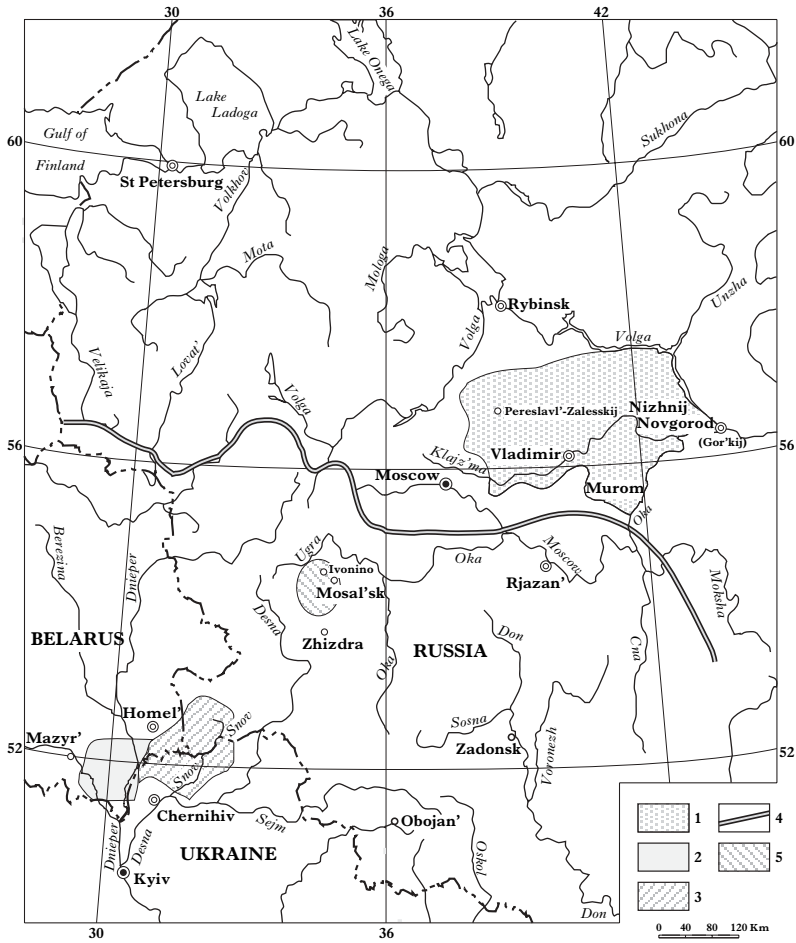


Figure 1

Locations of East Slavic dialects discussed.

1 = Vladimir-Volga Basin dialects; 2 = Malyja Aucjuki dialects; 3 = Upper Snov Basin dialects; 4 = Southern Russian dialect boundary (dissimilative dialects to the south of the boundary); 5 = dissimilative dialects west of Mosal'sk.

Adapted from Avanesov & Orlova (1965: 284).

sporadic cases of [o] being pronounced as [u̯o] under stress (Avanesov 1957). The outstanding features of these dialects are extended vowel duration and increased intensity in the stressed and immediately pretonic syllables. In other unstressed positions, vowel brevity and low intensity sometimes lead to complete vowel loss (Zaxarova 1970, Kasatkina 1996b: 232–233). Data are given in (1). As vowel length is not contrastive in any

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

of these dialects, the symbol V: represents phonetic vowel duration in the data below.[2]

(1) *Archaic Vladimir-Volga Basin dialects* (Type 1)

a. *Vowel system* ([i~ɨ] are allophonic)

under stress:	i~ɨ, u, e, o, a
immediately pretonic:	i~ɨ, u, e, o, a
elsewhere:	i~ɨ, u, ə ([a] in grammatical endings)

b. *Immediately pretonic* vs. *other pretonic*

/sadoˈvod/	[sədoːˈvoːt]	'horticulturalist'
/goloˈva/	[gəloːˈvaː]	'head'
/kulaˈkʲiː/	[kəlaːˈkʲiː]	'Kulaks'
/rukaˈva/	[rəkaːˈvaː]	'sleeves'
/dalʲeˈko/	[dəlʲeːˈkoː]	'far away'
/ogurˈtsi/	[ugurˈtsɨː]	'cucumbers'
/tʲemnoˈta/	[tʲimnoːˈtaː]	'darkness'
/posaˈʒu/	[psaːˈʒuː]	'I will plant'
/ˈzamuʒ/	[ˈzaːməʃ]	'married'
/ˈxolod/	[ˈxoːlət]	'cold'
/ˈvʲidʲela/	[ˈvʲiːdla]	'she saw'
/ˈmʲesʲatsa/	[ˈmʲeːsʲtsa]	'month (GEN SG)'

Instrumental analyses confirm the presence of increased duration and intensity in the immediately pretonic position (Al'muxamedova & Kul'šaripova 1980: 45), as shown in Table I.[3]

Vysotskij (1973: 38–40) compared these dialects to Contemporary Standard Russian (CSR), and the contrast in pretonic strength between these dialects and formal CSR is notable (Table II).[4] In the Vladimir-Volga

[2] IPA symbols are used. In Russian and Belarusian transcriptions, [ɨ] is a high back unrounded vowel, an allophone of /i/ after non-palatalised consonants, and in Ukrainian it is a front, mid/central vowel. /h/ in Ukrainian is a voiced laryngeal fricative. Data come from Zaxarova (1970), Al'muxamedova (1985), Kasatkin (1989), Kasatkina (1996b) and Pšeničnova (1996). Word-initial /o/ is sometimes pronounced as [u], a feature of many north Russian dialects, with which these dialects have a historical and typological connection. Complete vowel inventories for these and other northern Russian dialects are given in Vysotskij (1967) and Zaxarova (1970).

[3] Data were recorded in the field in 1969–77 from at least three representative speakers of each dialect. The experiment tested 300 words with a total database of over 20,000 tokens. Stimuli were pictures and whispered cues, and subjects recorded words into a microphone at normal speech rate under list (and sometimes declarative) intonation, because phrasal intonation differences among dialects are minimal under these conditions. Test items were controlled for consonant effects in terms of palatalisation, sonority, manner of articulation and, if possible, for place of articulation. Items for the most part included sequences of the same vowels within a word, e.g. /ˈsaxara/ 'sugar (GEN SG)', /paˈpaʃa/ 'daddy', /xoroˈʃo/ 'good', /kukuˈrudzu/ 'corn (ACC SG)', though there were examples of non-identical vowels, e.g. /ˈdʲedom/ 'grandfather (INSTR SG)', /gluboˈko/ 'deep'. See Al'muxamedova & Kul'šaripova (1980: 101–102) for the complete list of test items.

[4] Vysotskij (1973: 31–34) measured vowel and consonant durations in a representative 100–150-word sample recording one representative speaker of a given Russian

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

		initial V	pretonic V	stressed V	final V
Vladimir dialects	relative duration	25%	105%	100%	42%
	relative intensity	80%	95%	100%	45%
Murom dialects	relative duration	29%	102%	100%	36%
	relative intensity	80%	107%	100%	40%

Table I

Mean vowel intensity and duration relative to stressed vowel duration in CVCV'CVCV words.

		2nd pretonic V	1st pretonic V	stressed V
Vladimir-Volga Basin dialects	duration in ms	20	205	200
	relative duration	10%	103%	100%
Contemporary Standard Russian (formal pronunciation)	duration in ms	58	80	118
	relative duration	49%	68%	100%

Table II

Mean vowel duration relative to stressed vowel duration in stressed and pretonic positions in CVCV'CVC words with non-high non-front vowels.

Basin dialects, the immediately pretonic vowel is equal in duration to or longer than the stressed vowel. In CSR, the pretonic vowel is shorter than the stressed vowel.

In Type 1 dialects, non-high vowels are long before any stressed vowel, including /a/. As duration is most perceptible on non-high vowels, the data cited in the literature focus on pretonic /e, o, a/, but instrumental studies of a nearby Central Russian dialect (Moscow) also show durational differences in the high vowels (Kasatkina 2005). Type 1 prosody may be represented as in (2), where the non-contrastive pretonic duration is indicated by 'ː'. Stressed vowels by definition have additional duration, but because in these dialects they are so much longer than in CSR, they

dialect in the field. The tokens were trisyllabic real words with stress on the last syllable, with /o/ or /a/ following an unpalatalised voiceless stop or fricative, e.g. /topoˈtatʲ/ 'to stamp feet', /pokoˈpatʲ/ 'to dig a little', /potaˈkatʲ/ 'to connive', /zakaˈtatʲ/ 'to roll in, banish', in phrase-final or phrase-medial position under declarative intonation. He measured total word duration as an indicator of speech tempo, the duration of both consonants and vowels as a percentage of the total word duration (omitting the first and last C) and the duration of each segment as a percentage of the stressed vowel duration.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

are represented as V: below. A form such as /goloˈva/ 'head' would be pronounced with an extra short first syllable, but with additional duration in the tonic and pretonic position and with no vowel neutralisation in the immediately pretonic position, e.g. /goloˈva/ is [gəloːˈvaː] (cf. CSR [gəlɐˈva]).

(2) *Word prosody of tonic and pretonic syllables in Type 1 dialects*
CV̆CVːˈCVː

It is important to note that although the immediately pretonic syllable retains full vowel contrasts together with duration and a pitch peak, there are no reports of a perceived retraction of stress onto the pretonic syllable in the Vladimir-Volga Basin dialects. Lexical stress is also normally cued by strong posttonic vowel reduction, so there is no perceptual confusion about its actual position (Al'muxamedova & Kul'šaripova 1980: 49). Dialects to the south of Type 1 dialects neutralise the contrast between /o/ and /a/ and also lengthen vowels in immediately pretonic position, and here, too, stress remains in its etymological position.

2.2 Type 2: pretonic length dependent on stressed vowel quality

Another group of East Slavic dialects located south and southwest of Homel' in Belarus and north of Chernihiv in Ukraine also exhibit increased vowel duration in the immediately pretonic position. I focus here on the dialects spoken near Mazyr' in Belarus and on those northwest of the Snov River in Ukraine and Belarus (areas 2 and 3 in Fig. 1). Fieldworkers describe stress in these archaic dialects as having 'strength and a pitch increase at the beginning of the syllable, decreasing towards the end; if a long vowel is present in the pretonic syllable, the increase in strength begins on the pretonic and decreases on the stressed syllable' (Vajtovič 1972: 29), and a protracted, musical pronunciation of words (Kurylo 1924, Vajtovič 1972: 27).[5] Within the group, there are two main

[5] Field research by O. S. Bila in 1964–65 and 1967–70 obtained data from 48 settlement points in the Ščors and Horodnja districts in Ukraine, from eleven settlements in the transitional dialect area of the Dobruš district in Homel' province in Belarus and from nine settlements in Brjansk province in Russia. Kurylo (1924) worked in Xorobryči (Horodnja district, Chernihiv province), a continuously inhabited village located 14 kilometres from the town of Horodnja. She obtained data from speakers of all ages in small interview groups of 6–7 individuals. Most of the informants were female and long-time residents of the village. Sinjavs'kyj (1934) found similar phenomena further to the west in the town of Ljubeč (with pretonic [eː] and [oː]), as did Žylko (1953) in the Chernihiv dialects of Ukraine bordering on the Brahin, Lojeu and Homel' districts of Belarus. In 1959 Kryvicki reported that dialects of the Kalinkaviči district (known as the Aucjuki/Ovtjuki dialects) were characterised by extra duration and a special intonation on pretonic syllables if the stressed vowel was a high vowel: [voːˈdu] 'water (ACC SG)', [zroːˈbʲiu̯] 'he made', [maːˈlɨ] 'small', [plʲeːˈtu] 'I braid' (1959: 102–103). He investigated the speech in various villages in Homel' province: Siroda, Ladyžina, Lozak, Malyja and V'alikija Aucjuki, Boruska (Kalinkaviči district) and Hlinnaja Sloboda (Vasileviči district). More extensive

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

sub-types: in Belarus, the dialect represented by Malyja Aucjuki in the Kalinkaviči district of Homel' province generally preserves the contrast between /ɔ/ and /a/ in immediately pretonic position; in Ukraine, the dialects spoken in the Ščors and Horodnja districts of Chernihiv province regularly neutralise this contrast to [a] in all unstressed positions. The outstanding feature of the dialects in general is that pretonic length here depends on the nature of the vowel under stress: if the stressed vowel is a high or a high mid vowel, then the pretonic syllable is lengthened, if the vowel under stress is non-high, then the immediately pretonic syllable is of normal duration, e.g. [sɛˈstra] 'sister', [sɛːˈstr̪ɨ] 'sister (GEN SG)', as represented in (3).

(3) *Distribution of vowel length in tonic and pretonic syllables in Type 2 dialects*

CV'CV	~	CV:'CV
stressed V = low or low mid (/ɛ, ɔ, a/)		stressed V = high or high mid (/i~ɨ, u, e, o/)

These dialects have seven or eight vowels under stress, but neutralise the contrast between /ɛ/ and /e/ and between /ɔ/ and /o/ in all unstressed positions, including the immediately pretonic. Researchers claim that the high vowels do not lengthen in pretonic position, and the durational differences between a stressed and unstressed high vowel are minimal (Vajtovič 1972: 24).

2.2.1 *Type 2a: the Belarusian Malyja Aucjuki type.* The dialects in Belarus represented by that of Malyja Aucjuki for the most part preserve the contrast between /ɔ/ and /a/ in the immediately pretonic syllable. Four degrees of vowel height are found only under stress, and this contrast indicates the position of lexical (etymological) stress (4a). A pretonic non-high vowel is short before a stressed non-high vowel (4b), but long before a stressed high vowel (4c). High vowels do not lengthen perceptibly (4d). The data in (4) are from Vajtovič (1972) and Kryvicki (1959).[6]

---

fieldwork by N. T. Vajtovič and L. F. Šatalova in 1958 collected data from Malyja Aucjuki (Vajtovič 1972). An earlier analysis of these dialects is given in Bethin (2005).

[6] There are exceptions of almost every type in the Aucjuki data (Vajtovič 1972), including the absence of pretonic length when it is expected, as in [haˈdɨ̪] 'years', [vaˈzʲila] 'she drove', its presence when not expected, as in [kɔːˈpatsʲ] 'to dig', [rɔːsa] 'dew' (1972: 22), and initial length, as in [mɔːloˈdaja] 'young (FEM SG)' (1972: 24). Vowel elision is also common in these dialects, especially in word-initial position: [dna] from [aˈdna] 'one', [ˈvʲɛʧka] from [aˈvʲɛʧka] 'sheep, ewe', [uˈdzʲɛʒdɨ̪] from [u aˈdzʲɛʒdɨ̪] 'in the clothing'. There are instances of vowel neutralisation here and elsewhere, especially before stressed [a], e.g. /bɔrɔˈda/ [baraˈda] 'beard', and post-tonically, e.g. /ˈhɔlɔdu/ [ˈhɔladu] 'hunger (GEN SG)', /ˈvɔsʲɛnʲ/ [ˈvɔsʲanʲ] 'autumn', but /ɛ/ and /ɔ/ are often preserved in unstressed position (*okan'e*): /xɔlɔˈdɔk/ [xɔlɔˈdɔk] 'shade, cool place', /ˈsɔrɔk/ [ˈsɔrɔk] 'forty', /ˈvɔzʲɛra/ [ˈvɔzʲɛra] 'lake (GEN SG)'. These dialects are *okan'e*/*akan'e* types, and in close proximity to Belarusian dialects with full vowel neutralisation. There are many instances of vowel raising,

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

(4) *Belarusian dialect of Malyja Aucjuki* (Type 2a)

a. *Vowel system*

under stress:	i~ɨ, u, e, ɛ, o, ɔ, a
immediately pretonic:	i~ɨ, u, ɛ, ɔ, a
elsewhere:	i~ɨ, u, (ɛ), ə (some ɔ → [a], ɛ → [a])

b. *Short vowels before stressed non-high vowels*

[sʲɛˈstra]	‘sister’
[zʲɛˈmlʲa]	‘earth’
[bʲɛˈrɔza]	‘birch’
[vɔˈdɔju]	‘water (INSTR SG)’
[rɔˈdnʲɛju]	‘kindred (FEM ACC SG)’
[traˈvɔju]	‘grass (INSTR SG)’
[naˈzad]	‘backwards’

c. *Long vowels before stressed high vowels*

[sʲɛːˈstru]	‘sister (ACC SG)’
[zʲɛːˈmlʲi]	‘earth, land (GEN SG)’
[ptʃɔːˈlɨ]	‘bees’
[dvɔːˈru]	‘courtyard, yard (DAT SG)’
[kɔːˈlʲena]	‘knees’
[zaːˈvod]	‘factory’
[xvɔːˈmʲilʲija]	‘family, last name’
[kaːˈlʲinuʃku]	‘rowan tree (DIM ACC SG)’

d. *High vowels do not lengthen*

[bɨˈkʲi]	‘steer (PL)’
[kruˈʃɨna]	‘crumb’

2.2.2 *Type 2b: the Ukrainian Upper Snov Basin dialects.* Vowel neutralisation of /ɔ/ to [a] is much more regular in the Ukrainian dialects, occurring even in the immediately pretonic syllable, as shown in (5b, c). This pretonic /a/ is short before a stressed non-high vowel (5b), and long before a stressed high or high mid vowel, except before [u̯o], which tends to pattern with non-high (5c). There is a four-level height contrast under stress, /i/ and /ɨ/ are phonemic, and the high mid vowels are pronounced as diphthongs (5a). What is striking about these dialects is that the neutralised vowel itself may also be long under the appropriate prosodic conditions. Contemporary Standard Ukrainian (CSU), with no vowel neutralisation, is given for comparison. The data are taken from Kurylo (1924) and Bila (1970, 1974).

---

both under stress and in immediately pretonic position, where /a/ is pronounced as [ɛ] or [ɔ]: /daˈvaj/ [daˈvɛʲ] ‘give!’, and pretonic length is independent of this vowel raising, e.g. /karˈtɔplʲi/ [kɔrˈtɔplʲi] ‘potatoes’, /maˈʃɨn/ [mɔːˈʃɨn] ‘machines (GEN PL)’, /klʲaˈnu/ [klʲɛːˈnu] ‘swear (1SG)’.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

(5) *Ukrainian dialect of Xorobryči and other settlements in the Ščors and Horodnja districts* (*Chernihiv province*) (Type 2b)

a. *Vowel system* (/i/ and /ɨ/ contrast)

under stress:	i, ɨ, u, i̯e, u̯o, ɛ, ɔ, a
immediately pretonic:	i, ɨ, u, ɛ, a (ɔ → [a])
elsewhere:	i, ɨ, u, ɛ, a (ɔ → [a])

b. *Short vowels before stressed non-high vowels*

		cf. CSU
[pastaˈjala]	‘she stood awhile’	[postoˈjala]
[palaˈtna]	‘textile, cloth (GEN SG)’	[poloˈtna]
[pamaˈlɔla]	‘she ground up’	[pomoˈlola]
[anˈtu̯on]	‘Anton’	
[malaˈdʲɛts]	‘young man’	[moloˈdetsʲ]
[paˈdru̯os]	‘he grew up’	[pʲiˈdrʲis] (< older [pod-])
[kaˈnʲɛts]	‘end’	[koˈnetsʲ, kʲiˈnetsʲ]
[ʧɛˈtwɛrh]	‘Thursday’	

c. *Long vowels before stressed high or high mid vowels*

		cf. CSU
[naːˈsʲitʲ]	‘to carry’	[noˈsɨtɨ]
[paːˈluʧitsʲtsʲa]	‘it will be successful’	[poˈluʧɨtʲsʲa]
[rasplaːˈnʲiruvalʲi]	‘they planned’	
[aːˈdwʲikla]	‘she became unaccustomed to’	[oˈdvɨkla]
[wʲɛːˈlʲika]	‘big (FEM SG)’	
[plʲɛːˈtɨ]	‘braid!’	
[haːrˈbuzɨ]	‘melons’	
[stʲɛrɛːˈhu]	‘I guard’	
[naːˈsluxalasʲ]	‘she heard enough’	
[staːˈrɨx]	‘old (GEN, PREP PL)’	
[ʧalaːˈwʲi̯ek]	‘man’	[ʧoloˈvʲik]

2.2.3 *Discussion*. The two types of dialects differ slightly in where they make the cut-off in stressed vowel height for purposes of pretonic length. In the Belarusian type, both high mid vowels pattern with the high vowels in eliciting increased pretonic duration: [kɔːˈlʲena], [zaːˈvod]. In the Ukrainian dialects there is variation: the front diphthong ([i̯e]) patterns with high vowels but the back one ([u̯o]) often does not, e.g. [ʧalaːˈwʲi̯ek], [paˈdru̯os]. The Belarusian dialect retains a contrast between the mid rounded vowel /ɔ/ and /a/ in the immediately pretonic position, whereas the Ukrainian type has vowel neutralisation here and elsewhere.

The Malyja Aucjuki and the Upper Snov Basin dialects (Type 2) differ from the Vladimir-Volga Basin ones (Type 1) in making a distinction in stressed vowel height a condition for pretonic length. In the Type 1 system, a non-high vowel is lengthened before any stressed vowel. But in Type 2 dialects the duration of the pretonic vowel depends on the height of the stressed vowel. It is significant that field researchers, often speakers of standard Belarusian, Russian or Ukrainian, at times report the

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

(a)	test word	pretonic V	stressed V	% of total
declarative	[vaˈzɨ]	240	140	63%
interrogative	[vaˈzɨ]	280	90	76%
exclamatory	[vaˈzɨ]	300	340	47%
list	[vaˈzɨ]	300	310	49%
declarative	[vaˈzʲi]	240	130	65%
interrogative	[vaˈzʲi̯u̯]	230	60	80%
exclamatory	[vaˈzʲi]	210	220	50%
list	[vaˈzʲi]	300	280	51%

(b)	test word	pretonic V	stressed V	% of total
	[vaˈzʲi]	300	280	51%
	[vaˈzu]	340	300	53%
	[vaˈzʲi̯etʲ]	260	240	52%
	[vaˈzu̯ou̯]	280	420	40%
	[vaˈza]	200	320	38%
	[kaˈtʲura]	200	230	46%
	[vaˈzʲura]	230	230	50%
	[kaˈtʲaka]	110	300	26%

Table III

Pretonic vowel duration in Type 2 dialects in ms and as a percentage of total tonic and pretonic vowel duration: (a) under different phrase intonations; (b) under list intonation (Bila 1974: 26).

perception of a leftward stress shift in Type 2 dialects (Broch 1916: 9, Kurylo 1924: 37, Kryvicki 1959: 102, *DABM* 1963: 274–275).[7] However, the preservation of full vowel contrasts, and especially the distinction within the mid vowels (/e/, /i̯e/ and /o/, /u̯o/ are opposed to /ɛ/ and /ɔ/) in the stressed syllable but not in the immediately pretonic one, indicates that there is prominence on the etymologically stressed syllable.

The only available instrumental studies, Bila (1970, 1974), measured the duration of unstressed /a/ and /ɛ/ in immediately pretonic position before stressed high vowels under different sentence intonations for

[7] The Belarusian dialect atlas (*DABM* 1963: 274–275) cites the following forms for Vjaliki Bor (Xojni district, Homel' province): [ˈstalɨ] 'tables', [ˈkaʒux] 'fur', [ˈvada] 'water', [ˈvalɨ] 'oxen', [ˈvarɔtɨ] 'gates', [ˈzamok] 'lock', [ˈkarovɨ] 'cows', all of which show stress retracted onto a reduced vowel with the original full vowel height contrast still preserved in the place of etymological stress. For Spjaryžža (Brjahin district, Homel' province) the forms [staˈlɨ], [vaˈda], [na staˈlʲɛ] 'on the table' are given, with the comment that stress was put on the syllable before the one with stress, as if to say [ˈstalɨ], [ˈvada], etc., and was restored to its etymological place when queried. See also data for Svedskae (Rečyca district, Homel' province).

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

	3rd pre-tonic V	2nd pre-tonic V	1st pre-tonic V	stressed V	1st post-tonic V	2nd post-tonic V
(a) [dadvadtsaːˈtʲi] 'twenty'	80 17%	90 19%	200 43%	100 22%		
[napraːˈhulku] 'for a walk'		80 20%	170 44%	70 17%	80 20%	
[naːˈvulʲitsu] 'onto the street'			210 42%	80 16%	110 22%	110 22%
(b) [xalaˈdu̯ok] 'shade'		100 26%	100 26%	180 47%		
[paˈstalʲi] 'they stood'			120 38%	120 38%	70 22%	

Table IV

Duration of stressed and unstressed vowels in ms and as a percentage of total vowel duration in word: (a) with lexical stress on a high vowel; (b) with lexical stress on a non-high vowel (Bila 1970: 255–257).

speakers of Upper Snov Basin type of dialects. As Bila (1974) focused primarily on measuring and documenting pretonic length, there is little data for comparison with stressed non-high vowels. It is not exactly clear where in the sentence the test items occurred. Bila reports data for four different intonation patterns; the test item may have been in prominent position within the intonational phrase. Results below are for one speaker who produced a specific set of sample words. No glosses are provided. Of interest here is the fact that the duration of the pretonic vowel does not vary much as a consequence of phrasal intonation, as shown in Table III.

The data in Table IIIa show that the duration of the immediately pretonic [a] remains about the same under different phrase intonations, unlike that of the stressed vowel. The data in Table IIIb show that under list intonation, which normally has the effect of lengthening all vowels and especially the stressed vowel, the stressed vowel is barely longer or not longer than the pretonic one, except in the case of the triphthong and /a/. The trisyllabic words confirm that durational differences in pretonic position are dependent on the height of the stressed vowel: [a] before stressed [u] in [kaˈtʲura] is twice as long as before stressed [a] in [kaˈtʲaka]. When compared to Contemporary Standard Ukrainian, where a stressed vowel on the average would be more than twice as long as the pretonic vowel under list intonation, e.g. CVˈCV has a ratio of 36% to 64% and CVˈCVCV is 21% to 48% of total vowel duration in the word (Toc'ka 1969: 127–130), the difference is striking.

The immediately pretonic position, with its alternation in vowel duration, also differs significantly from other unstressed positions. In words where lexical stress falls on a high vowel, [a] in immediately pretonic position is approximately twice as long as [a] in other unstressed positions

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

	2nd pretonic V	1st pretonic V	stressed V
/a/	64	72	125
/o/	66	74	120
/e/	66	70	116
/ɨ/	70	50	110
/i/	60	68	82
/u/	38	90	110

Table V
Contemporary Standard Ukrainian mean vowel duration in ms for pretonic and stressed positions (Toc'ka 1970: 26).

(Table IVa). But in words where lexical stress falls on a non-high vowel, [a] in immediately pretonic position is about the same duration as [a] in other unstressed positions and as [a] under stress (Table IVb).[8]

Compare stressed and unstressed vowel durations in Standard Ukrainian (Table V).[9] Measurements of intensity follow the same general pattern, where Bila reports that 'the greatest intensity is found in pretonic [a] before stressed [i], [u], [ɨ], [i̯e] and [u̯o] in spoken narratives under various intonation contours, among them list intonation' (Bila 1974: 28).[10]

To summarise, both Type 2 dialects have increased duration and intensity before stressed high vowels, /i, ɨ, u/. In the Belarusian variant, the high mid vowels, /e, o/, pattern with high vowels. In the Ukrainian variant, the diphthong /i̯e/ patterns with high vowels, but /u̯o/ does not. The basic prosodic profile of the Malyja Aucjuki and Upper Snov Basin dialects is given in (6).

(6) *Word prosody of tonic and pretonic syllables in Type 2 dialects*

$CV_1{}'CV_2$	~	$CV:_1{}'CV_2$
V_1 = /ɛ, ɔ, a/		V_1 = /ɛ, ɔ, a/
V_2 = /ɛ, ɔ, u̯o, a/		V_2 = /i, ɨ, u, e/i̯e, o/

Neither vowel raising of /a/ to /ɛ/ or /ɔ/ nor vowel neutralisation of /ɔ/ and /a/ to /a/ has any effect on pretonic length, and the length alternations take

[8] The data were obtained from one informant in a recorded continuous speech context where the test items appeared in different positions within a sentence. There is a slight consonantal effect on vowel duration, as Bila (1970: 254) notes, in that a following palatalised consonant adds to the duration of a preceding [a] while a preceding palatalised consonant has a similar effect on a following [ɛ]. The /v/ in Bila's transliterated data is most likely a [w] in phonetic transcription.

[9] The data are based on Toc'ka (1966), where she measured the duration of vowels for one speaker for over 1000 CVCV words and for eight speakers producing several repetitions of 16 polysyllabic words (300 tokens) pronounced in isolation.

[10] Work by Sluijter & van Heuven (1996) shows that intensity may not be a reliable correlate of stress and that spectral balance is a better cue. We have no spectral balance data for the dialects.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

place as expected under appropriate conditions. The alternation between longer and shorter vowel durations in the immediately pretonic syllable depends on the quality of the stressed vowel.

3 The relationship of stress, tone and pretonic length

I propose that the key to understanding the phenomenon of pretonic length in these East Slavic dialects is the pitch contour on the immediately pretonic and tonic syllables. Specifically, phonological lexical prominence is indicated by both stress and high tone. The high tone is phonetically implemented as a fixed rising-falling tonal contour, LHL. In Type 1 dialects the high tone is associated with the pretonic syllable, and the vowel in that syllable lengthens to accommodate the pitch rise. The stressed syllable has low tone. In Type 2 dialects, the implementation of high tone depends on the quality of the vowels in tonic and pretonic positions. If the vowel under stress is a high vowel, the high tone is on the pretonic syllable and its vowel lengthens to accommodate the pitch rise. The stressed syllable then has low tone. But if the vowel under stress is a non-high vowel, the high tone may coincide with stress. The pitch rise is advanced toward the stressed syllable, and there is a falling tonal contour on the stressed syllable. The analysis of pretonic length in the Type 2 dialects hinges on two critical cross-linguistic phonetic facts: (i) vowel height correlates with different inherent vowel durations, high vowels having the shortest and low vowels the longest intrinsic duration (Lehiste 1970, Westbury & Keating 1980); (ii) pitch rises require greater duration than do pitch falls of the same excursion size (Ohala & Ewan 1973, Ohala 1978, Sundberg 1979, Zhang 2004).

3.1 Phonetic realisation of the tonal contour as LHL

The following discussion is based on field reports of pitch contours. Lexical prominence is said to be articulated as a rising-falling pitch contour over two syllables in both types of dialects. The tonal contour is distributed evenly between the stressed and the pretonic syllables in Type 1 dialects (7a). In Type 2 dialects, there is an alternation in how the LHL mapping is carried out, and the duration of immediately pretonic syllables directly depends on the type of vowel under stress, LH-L or L-HL (7b).

(7) *Stress and tone mapping*

a. *Archaic Vladimir-Volga Basin dialects* (Type 1)

	LH		L
C	V:	ˈC	V:

b. *Malyja Aucjuki and Upper Snov Basin dialects* (Type 2)

	LH		L			L	HL
C	V:	ˈC	V	C	V	ˈC	V
	[−high]		[+high]		[−high]		[−high]

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

Because vowel length is not contrastive in East Slavic or in these dialects, phonetic lengthening is generally tolerated (Gordon 2002). In Type 1 dialects duration (and intensity) are more or less evenly distributed within the disyllabic domain ([gəloːˈvaː]), and there is no synchronic variation in the placement of the tonal contour within the domain. It is not surprising then that fieldworkers do not remark on a perceived leftward shift of stress. The more interesting case is the prosody of Type 2 dialects, where the tonal contour is distributed differently within the disyllabic domain, depending on the intrinsic duration of the vowel under stress. Here stress is sometimes perceived as being on the long pretonic syllable. Bila (1974: 23) asked schoolchildren in this dialect area to indicate the place of word stress in words which had pretonic length. The immediately pretonic long syllable was marked as having word stress in 51% of the cases, but note that stress was perceived in its etymological position in 49% of them.

Pretonic length may be attributed to the fact that high vowels do not have sufficient duration to accommodate the pitch contour, and more of the contour is displaced onto the preceding syllable (8a). If the vowel under stress is a non-high vowel, then it can accommodate more of the contour and the pretonic syllable need not lengthen (8b). Dialectologists do not report tonal contours on high vowels either under stress or in pretonic position in the Type 2 dialects. High vowels in general do not lengthen in these positions.

(8) *Tonal contours in Type 2 dialects*

a. LHL *on stressed high vowels*

LH L	(L) H L
C a: ˈC i	C i ˈC i

b. LHL *on stressed non-high vowels*

L HL	L HL
C a ˈC a	C i ˈC a

The cases discussed so far involve pretonic length and non-initial lexical stress. But what happens when lexical stress falls on the word-initial syllable? If the mapping of the full tonal contour cannot be syllable-internal and if the stressed syllable is always associated with the falling pitch contour or low tone, then we would expect that in word-initial position the tonal contour should be only falling or low. This also predicts that if a vowel does become available before words with initial stress in the phonological/prosodic word, as in preposition + noun combinations or in negation, then it should serve as the point of association for the rising pitch component of the LHL contour. This is exactly what we find, as shown in (9) (data from Bila 1974, Vajtovič 1972).

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

(9) *Tonal contours on initial stressed vowels in Type 2 dialects*

a. LHL *on stressed vowels in the first syllable of the word*

(L)HL	(LH)L
ˈC a C i	ˈC i C a

b. *Prepositions and negation with nouns*

i. *Stressed high and mid high vowels*

[naː ˈwulʲitsu]	‘onto the street’
[paː ˈribu]	‘for fish’
[prɔː ˈxlʲeb]	‘about bread’
[naː ˈwuhelʲ]	‘for coal’
[aːt ˈsupu]	‘from soup’
[nʲɛː ˈspʲitʲ]	‘is not sleeping (3SG)’

ii. *Stressed non-high vowels*

[na ˈpʲɛnʲ]	‘onto a/the tree stump’
[pad ˈʃapkuj]	‘under the hat’

c. LHL *on prepositions + nouns with word-initial stress*

LH L	L HL
n aː ˈwu lʲi tsu	na ˈpʲ ɛ nʲ

These data strongly suggest that pretonic length is a feature of word prosody. There are no reliable instrumental measurements of pitch contours for the dialects in question. But there is evidence to suggest that tone is a lexical property in these and related dialects. First, there are nearby dialects which have lexically determined tone patterns on the initial syllable of words. Instrumental pitch-track data for monosyllabic words in some Ukrainian-Belarusian border dialects in Chernihiv province are given in Nikolaev (1996) and in Dybo & Nikolaev (1998, with 142 pitch tracks; see also Nikolaev 1995, and corrected data in Nikolaev 2000, 2002, 2003). Words were tested in phrase-initial position in affirmative sentences (Nikolaev 2002: 145). The pitch contrast is described as one between a rising-falling and a falling pitch contour. (The data in (10) are from Nikolaev 2000: 97–99.)[11]

(10) *Tonal contours for monosyllables in border dialects* (*Plexov and Anisov, Chernihiv district*)

	Plexov	*Anisov*	
płuɣ	HL	LHL	‘plough’
klʲutʃ	HL	LHL	‘key’
druɣ	LHL	LHL/HL	‘friend’
brat	HL/LHL	LHL	‘brother’
płaʃtʃ	HL	LHL/HL	‘coat’
jad	HL	HL	‘poison’

[11] Nikolaev (2002: 143–145) measured pitch contours during the vowel for one speaker of each dialect type, who pronounced the word in a list or in phrase-initial position of affirmative sentences.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

Note the variation of pitch both within and across dialects (alternative pronunciations are possible, as shown). Nikolaev (2002) also reports tonal contrasts for dialects in north central Russia, in the Pešexony district near Rybinsk in Jaroslavl' province. These dialects lie directly to the north of the Type 1 archaic Vladimir-Volga Basin dialects.

Second, there are dialects west of Mosal'sk in Russia with a fixed tonal contour on the tonic and immediately pretonic syllables (see area 5 in Fig. 1). Broch (1916: 8) characterises the lexical word stress of these dialects as having a pitch contour reminiscent of confirming phrase intonation in CSR. This pattern has a high tone on the pretonic syllable and a low tone on the stressed syllable, as in the response to the question *Ona u vas byla* [LH]*? Byla* [HL]! 'Was she at your place? She was!'. When there is no pretonic syllable, 'stress, falling on the initial syllable of the word, may be called high-toned and falling; it is similar to the Serbian ˆ [long falling pitch accent]' (Broch 1916: 8). The Ivonino dialect also has extended vowel duration in both tonic and pretonic positions: [xuːˈdoːj] 'thin (MASC SG)', [xuːˈdaːja] 'thin (FEM SG)', [xaːˈdʲiːt] 'to walk', including in preposition + noun combinations, e.g. [naːˈpoːʃtʲi] 'at the post office' (1916: 9). This tonal contour is reported for words that are in unaccented position within the intonational phrase. Broch (1916: 9) claims that when the word occurs in accented position within the phrase, phrasal accent (intensity, duration, pitch rise) is implemented on the stressed syllable.

Ideally, one would like to have data on how phrasal intonation affects word prosody in these dialects. Bila reports (1974: 29) that 'the movement of the fundamental frequency on pretonic [a] is complex: rising-falling or rising-falling-rising. On the stressed syllable, compared to the pretonic one, the fundamental frequency curve depends on the intonational contour of the sentence and the position [of the word] in the sentence, and it is rising, level, or falling'. The presence of a rising-falling contour on pretonic [a] in the Malyja Aucjuki and Upper Snov Basin dialects is what would be expected under the analysis proposed here.

Although we do not have instrumental information on the pitch contours of the archaic Vladimir-Volga Basin dialects, there is some evidence that the stressed vowel is associated with low or falling tone in other dialects of this area. Al'muxamedova (1970) finds rising-falling phrasal intonation in dialects some distance to the east of the archaic Vladimir-Volga Basin group. There is a pitch rise on the second or third syllable of the declarative (syntagmatic) phrase and a pitch fall at the end of the phrase if it ends in a monosyllable or a word with final stress. However, if the phrase ends in a word whose stress is not final, then the pitch fall is associated with the stressed syllable of the word and the phrasal intonation rises slightly at the end (Al'muxamedova 1970: 30). The association of a falling pitch contour with stress, either in word prosody or phrasal prosody, is characteristic of dialects in this general region.

Finally, evidence from vowel neutralisation/reduction in the Type 1 Vladimir-Volga Basin dialects indicates that both stress and tone serve to protect full vowel contrasts in the face of strong vowel reduction

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

elsewhere, e.g. /rukaˈva/ [rəkaːˈvaː] 'sleeves'. The pattern of vowel neutralisation/reduction within a word is a feature of its word prosody, and the pattern holds regardless of the position of the word in the sentence. Pending further investigation, I will take the tonal contour to represent word accent in these dialects.

There may be a connection between Type 1 and Type 2 prosody, in that pretonic length may have been more general at one time in Type 2 dialects. Kurylo (1924: 37) reports an informant's claim that her mother pronounced a long vowel in the pretonic syllable regardless of the type of vowel under stress, as in [ʧɛːˈsala] 'she combed'. Žylko (1953: 11) found pretonic long vowels before stressed [a] in the Ljubeč and Ripkin districts of northwest Chernihiv province, e.g. [baːˈlaʧka] 'gossip, small talk', [baːˈtʲkamɨ] 'parents (INSTR SG)', [paːˈʃla] 'she went', [kaːˈza] 'goat', even when the pretonic vowel was subject to neutralisation/reduction, as in [paːˈʃla], [kaːˈza]. This suggests that the pattern of pretonic length as dependent on the quality of the stressed vowel (Type 2 prosody) may be the innovating pattern on the basis of Type 1 prosody, where the pretonic length is independent of the stressed vowel quality. The change then would be toward more closely aligning the tonal contour with intrinsic vowel duration. Phonetic lengthening is generally tolerated, and especially so in the low vowels, where, as Gordon (2002: 73) puts it, additional duration comes at no cost because 'in languages with phonemic length contrasts there is less room for the intrinsically longer low vowels to enhance their inherent length by undergoing additional lengthening, because additional subphonemic lengthening would potentially lead to neutralization of phonemic length distinctions .... But in languages without phonemic vowel length, contrasts based on vowel quality can safely be accompanied by large differences in duration without endangering any phonemic length contrasts'.

We saw that vowel duration has a bearing on the implementation of the pitch contour in Type 2 dialects. In general, there is a significant body of evidence implicating phonetic duration and sonority in the implementation of tonal contours (Gordon 2002, Zhang 2002, 2004), suggesting that certain phonetic characteristics – not just phonologically strong positions – are better carriers of certain types of contrast. Zhang (2002, 2004) specifically argues that duration and sonority of the syllable rhyme directly affect the production and perception of contour tones. He demonstrates that phonetic duration, as found for example in word-size differences and in phrase-final lengthening, has a role in permitting greater tonal contrasts. An extension of this approach would lead us to predict that high vowels should be less likely to host tonal contours than low vowels, though Zhang does not cite any such cases in the mapping of tonal contrasts. Yet it is clear that vowel height and its attendant sonority and duration do have an instrumental role in the mapping of the non-contrastive tonal contour of East Slavic dialects. However, the decision on where the threshold falls for sufficient duration must still be specified for each dialect type. It is also of interest that a relationship between vowel

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

duration and the realisation of tonal association has been found for nuclear (non-utterance-final) accents in Dutch (Schepman *et al.* 2006).

3.2 Tone placement in dissimilative dialects

One might expect that a further innovation of even more closely associating the expression of tonal contours with intrinsic vowel duration would produce a system in which phonetic pretonic lengthening became simply an alternation of vowel quality dependent on the height of the stressed vowel. A representation of such an alternation in the tonic and immediately pretonic syllable is given in (11).

(11) $CV_1{}'CV_2$ ~ $CV_1{}'CV_2$
V_1 = non-high; V_2 = high V_1 = high; V_2 = non-high

Such systems, with variants depending on which vowels count as sufficiently high/non-high, are actually found among the neighbouring dissimilative *akan'e*/*jakan'e* dialects (to the south of the isogloss on the map in Fig. 1). (For a description of the Russian dialects, see Avanesov & Orlova 1965, Kasatkin 1989: 43–55; for Belarusian, see Vajtovič 1968.) In the dissimilative dialects the quality of the immediately pretonic vowel depends on the quality of the stressed vowel. These are highly neutralising systems, with limited vowel reflexes in pretonic position (12).

(12) *Neutralisation of* /ɛ, ɔ, a/ *in immediately pretonic position in three representative dissimilative* jakan'e *dialects*

	immediately pretonic	*stressed vowel*	
a. *Don*	[a]	/i~ɨ, u/	—
pattern	[ə] or [i]	/e, o, ɛ, ɔ, a/	[sʲi'lo, sʲi'lʲe, sʲi'lɔm, sʲi'la]
b. *Obojan*	[a]	/i~ɨ, u, e, o/	[sʲa'lo, sʲa'lʲe]
pattern	[ə] or [i]	/ɛ, ɔ, a/	[sʲi'lɔm, sʲi'la]
c. *Zhizdra*	[a]	/i~ɨ, u, e, o, ɛ, ɔ/	[sʲa'lo, sʲa'lʲe, sʲa'lɔm]
pattern	[ə] or [i]	/a/	[sʲi'la]

The dissimilative dialects resemble Type 2 dialects in that the nature of the vowel in the pretonic syllable depends on the quality of the stressed vowel. The occurrence of [a] *vs.* [ə] or [i] involves differences in vowel duration, though not on the scale found in 'pretonic length' dialects. For example, Kasatkina & Ščigel' (1996: 239–240) show that the vowel in the immediately pretonic syllable varies in duration depending on the type of vowel under stress, with pretonic [i] and [ə] durations ranging from 46–80 ms before stressed [a], and pretonic [a] ranging from 63–92 ms before a stressed high vowel, as in /toˈgda/ [təˈgda] 'then' (with [ə] = 70 ms and [a] = 134 ms) and /ʒeˈnʲix/ [ʒaˈnʲix] 'bridegroom' (with [a] = 92 ms and

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

[i] = 75 ms). It has been suggested that what appears to be a qualitative alternation (dissimilation) is fundamentally a type of quantity dissimilation (Šaxmatov 1915, Broch 1916, Kurylo 1928, Vajtovič 1972: 38–39, Bila 1974: 30–31, Nazarova 1977: 246–255, Čekmonas 1987, Timberlake 1993, Kasatkina 1996a, b, 2005, Crosswhite 1999, Kasatkin 1999 and others).[12]

If it is true that the prosody of dissimilative dialects is typologically and historically related to the word prosody of the Malyja Aucjuki/Upper Snov Basin types, then one might expect some traces of a pitch contour in dissimilative dialects as well. And this is exactly what we find. As already mentioned, Broch (1916) reports that words in dialects west of Mosal'sk in Russia (area 5 on map) have a fixed tonal contour. In the Ivonino dialect, the tonal contour is described as a rising-falling contour LHL over the tonic and pretonic syllables, accompanied by increased duration in both positions, unless the vowel under stress is /a/. If the stressed vowel is /a/, then the pretonic [ə] or [i] is short. In nearby villages to the southwest of Mosal'sk, there is no vowel lengthening, and unstressed syllables are short. But these dialects preserve the tonal relationship between the pretonic and tonic syllables. Broch (1916: 46) writes: 'the highest (rising) tone belongs to the syllable before the stressed one, while the stressed syllable itself is pronounced at a lower interval' and 'the interval from the high-toned pretonic to the low-toned stressed syllable is generally smaller [than in the Ivonino type; CYB]'. The HL contour here, given in (13), is considered to be a newer variant (see also Kasatkin 1989: 35). Stress on a word-initial syllable is pronounced with a falling pitch contour in both dialect types.

(13) *Tonal contour in the dissimilative dialects*

H L		HL
$CV_1{}'CV_2$	~	$CV_1{}'CV_2$
V_1 = non-high; V_2 = high		V_1 = high; V_2 = non-high

In this type of system, the pitch peak is associated with the stressed syllable if it has a vowel of sufficient intrinsic duration. If the stressed vowel is too short, then the pitch peak falls on the intrinsically longer

[12] Timberlake (1993) relates properties of dissimilative *akan'e*/*jakan'e* to intersyllabic isochrony. Crosswhite (1999) provides a mora-based analysis of vowel neutralisation/reduction in Russian in which she distinguishes between contrast-enhancing neutralisation in immediately pretonic position and prominence reduction elsewhere in the word. In attributing the vowel alternations found in the dissimilative dialects to vowel duration (and mora-bearing ability) instead of to qualitative dissimilation, her analysis is in general agreement with proposals of Kurylo (1928), Vajtovič (1972: 38–39), Bila (1974: 30–31), Nazarova (1977: 246–255) and Čekmonas (1987), who see quantity dissimilation as a precursor to dissimilative *akan'e*/*jakan'e*. Work on other types of dissimilative *akan'e* dialects also finds a type of quantity dissimilation (Burova & Kasatkin 1977, Čekmonas 1980, 1987, Kasatkina & Ščigel' 1995, Kasatkina 2005). For generative analyses of dissimilative Russian dialects that propose a dissimilation of vowel quality, see Halle (1965) and Davis (1970).

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

pretonic low vowel. If the stressed vowel is long enough, then the pitch contour is fully realisable on the stressed syllable. The stressed syllable is always associated with low or falling pitch contour, and there are no reports of a 'musical' intonation in these dialects. As in the Type 2 dialects, the cut-off for what is considered to be sufficient duration must be specified for each dissimilative dialect type. But it moves along a scale of intrinsic vowel duration. The differences in intrinsic vowel duration are interpreted as a sonority hierarchy with respect to high tone association. Tone and stress occur on short vowels, but the placement of high tone favours a vowel with higher sonority over one with lower sonority.

4 Comparison with other stress and tone systems: Neo-Štokavian and Swedish

4.1 Comparison with the Neo-Štokavian dialects of Croatian or Serbian

In having both stress and tone marking word accent, the prosody of the East Slavic dialects resembles that of Slavic pitch-accent systems such as the Neo-Štokavian dialects of Croatian or Serbian. As analysed here, the prosodic system of the East Slavic dialects has lexically contrastive stress and placement of a high tone with respect to stress. East Slavic is the mirror image of Neo-Štokavian prosody, where the position of tone is contrastive and stress is assigned with respect to tone (Lehiste 1970, Browne & McCawley 1973, Lehiste & Ivić 1986, Bethin 1994, Zec 1999 and elsewhere). The two are compared in (14).

(14) a. *East Slavic 'pretonic length' dialects*

/CV'CV/	H CV'CV	(rising-falling; falling on stressed V)
/'CVCV/	H 'CVCV	(falling on stressed V)

b. *Neo-Štokavian dialects*

/CVCV/	H H 'CVCV	(rising on stressed V)
/CVCV/	H H 'CVCV	(falling on stressed V)

There is a contrast in pitch contour in Neo-Štokavian between rising and falling pitch on a stressed syllable. But in East Slavic, the pitch on the stressed syllable is always falling or low. Neo-Štokavian has been analysed as a mixed prosodic system, where both tonal feet and stress feet cooperate in word prosody, a 'case of *bilateral* interaction between tone and foot structure' (Zec 1999: 226). In the East Slavic dialects, on the other hand, there is no apparent motivation for postulating tonal feet. Word accent is based simply on the interaction of various prominence hierarchies and a specific tone-placement requirement.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

4.2 Comparison with Stockholm Swedish

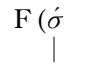
The placement of high tone before the stressed syllable in East Slavic results in a monomelodic prosodic profile where the tonic and immediately pretonic syllables share a fixed LHL tonal contour (word-initially HL). This type of prosody resembles other monomelodic systems such as Stockholm Swedish or East Norwegian, where an HL contour is associated with the stressed syllable. There is a tone contrast in Swedish on the stressed syllable, as shown in (15). F stands for foot and (σ́ for the stressed syllable in the trochaic foot.

(15) *Stockholm Swedish lexical tones* (Gussenhoven & Bruce 1999: 237)

a. *Accent I*



b. *Accent II*



As the guest editors of this issue point out, the tonal shape in both Swedish and East Slavic involves a turning point which falls outside the stressed syllable. However, in East Slavic the tonal contour on the stressed syllable is always a falling (or low) contour, while in Swedish the stressed syllable is associated with one of two possible contours. The difference between Swedish Accent I and Accent II has been analysed as a question of timing: word accent is associated with the low tone of an H + L contour in Accent I, but with the high tone in Accent II (Bruce 1977).[13] There is a contrast in stressed syllables, in that either high tone or low tone is associated with stress, although the overall contour remains H + L. But in East Slavic there is no pitch contrast under stress, other than a variation between low or falling tone, depending on the timing of high tone: LH-L *vs.* L-HL. The stressed syllable is always associated with low tone in East Slavic.

4.3 Summary

East Slavic 'pretonic length' dialects have two loci of prominence within a word: the syllable with high tone and the syllable with stress. Stress and tone systems often have distributional restrictions on where a pitch contrast may occur. In Neo-Štokavian, falling pitch is limited to initial syllables, rising pitch is not found in word-final position and a tonal contrast is limited to the word-initial position. In Swedish, stress may be final, penultimate or antepenultimate, but a tone contrast occurs only on non-final syllables. The East Slavic dialects do not have a distributional restriction on where the tonal contour may occur in a word. Even when only part of the contour is mapped, as in word-initial syllables with HL,

[13] An alternative privative interpretation of Stockholm Swedish tone is given in Riad (1998), based on instrumental evidence from Engstrand (1995, 1997).

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

there is no pitch contrast in word-initial position. In East Slavic, stress and tone are independently present, but the tonal contour is never contrastive.

5 Duration, vowel neutralisation and vowel reduction

In many languages, the absence of vowel neutralisation in stressed syllables serves to mark prominence, and neutralisation is often a heuristic for the absence of prominence, as in standard Belarusian or Russian. All of the 'pretonic length' dialects discussed here maintain full vowel contrasts under stress. In Type 2 dialects, which have an additional distinction in mid vowel height under stress, the contrast between /ɛ/, /ɔ/ and /e/ ~ /i̯e/, /o/ ~ /u̯o/ is neutralised in all unstressed positions, including the immediately pretonic. Recall that both the archaic Vladimir-Volga Basin and some Upper Snov Basin dialects have vowel neutralisation in unstressed positions other than immediately pretonic. This neutralisation/reduction is sometimes so extreme that it results in complete vowel loss, as in [psaˈʒu] 'I will plant' from /posaˈʒu/, so these appear to be clear cases of abbreviated vowel duration.

According to some recent accounts of vowel neutralisation/reduction, vowel duration is critical for the expression of full vowel contrasts. If there is insufficient duration, vowel contrasts cannot be fully implemented or perceived, and neutralisation will take place (Steriade 1994a, b, 2000, Flemming 1995, Crosswhite 1999 and others). Reduced phonetic duration has been implicated in vowel-neutralisation/reduction phenomena (Lindblom 1963; for Russian and other Slavic languages, see Crosswhite 1999, Barnes 2002, Padgett & Tabain 2003). Padgett & Tabain (2003) confirm the inverse relationship between jaw raising and vowel duration for Russian, supporting Flemming's (1995) claim of vowel undershoot in the pronunciation of low vowels in unstressed position. In Crosswhite's (1999) analysis of moderate *akan'e* in CSR and *akan'e*/*jakan'e* in the dissimilative dialects, vowel neutralisation in the immediately pretonic syllable is the result of eliminating contrasts that are difficult to perceive in unstressed position in favour of the maximally dispersed vowels, /i/, /u/ and /a/. Elsewhere it is a question of not pronouncing vowels which require longer duration in positions that prefer short duration, and here the neutralisation of /o/ and /a/ produces schwa. Barnes (2002) distinguishes immediately pretonic from other positions in CSR. Neutralisation in the immediately pretonic syllable is taken to be 'the phonologized result of perceptual difficulties produced by duration-dependent undershoot' (2002: 2). Elsewhere, neutralisation produces schwa, and is an 'unphonologized process of duration-dependent raising' (2002: 88). Under either interpretation, vowels under stress must have greater duration than unstressed vowels.

The presence of vowel neutralisation in the immediately pretonic syllable of the Ukrainian Upper Snov Basin dialects (Type 2b) then appears

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

to contradict durationally based functional explanations of vowel neutralisation/reduction, because these vowels are exceptionally long. In fact, vowel neutralisation in these dialects may be assisted by pretonic length. The increased duration of the immediately pretonic vowel allows a pronunciation of /ɔ/ with significant jaw lowering (Keating 1983), which makes lip rounding more difficult, thereby facilitating a change of /ɔ/ to [a]. Vowel neutralisation in the immediately pretonic position in these East Slavic dialects, then, is related to duration, but it may be the result of *increased* rather than decreased duration. If vowel neutralisation can be facilitated by increased phonetic duration, then systems which have pretonic length should favour vowel lowering rather than vowel raising in neutralisation. In the Malyja Aucjuki and the Upper Snov Basin dialects there are sporadic cases of neutralisation of the front mid vowel /ɛ/, and as predicted, /ɛ/ lowers to [a] (Vajtovič 1972: 23, Nazarova 1977: 237).

(16) *Neutralisation of* /ɛ/, /e/ *to* [a] *in Type 2 dialects*

[bʲaˈda]	'misfortune'	cf.	CSR	/bʲeˈda/
[vʲarˈba]	'willow'		CSU	/verˈba/
[sʲaˈlo]	'village'		CSU	/seˈlo/
[pʲaˈsok]	'sand'		CSR	/pʲeˈsok/

Recall also that the dissimilative dialects are characterised by *jakan'e*, where /e/ is neutralised to [a] in the immediately pretonic syllable if the stressed vowel is high.

Clearly, there are two different processes at work (as Crosswhite 1999 shows for CSR and dissimilative dialects). Vowel neutralisation favours [a] in the immediately pretonic position; elsewhere neutralisation favours [ə] or [i] as a form of vowel reduction. The effect of duration may be different in the two cases, and neutralisation to a full vowel [a] should be distinguished from neutralisation/reduction to [ə]. The former, at least in the East Slavic dialects discussed here, may be a process of vowel lowering facilitated by increased vowel duration.

6 Conclusions

6.1 Directions of future research

The prosody of 'pretonic length' and related dialects clearly requires further investigation. While field reports are generally accurate and reliable, it would also be useful to have F0 tracks for the dialects discussed. They should reveal the nature of the tonal contour and give us precise information about its distribution within the word. The phenomena described here raise many questions for further research. Is the H target achieved in the pretonic syllable in Type 1 dialects? Does the pitch peak in Type 2 dialects associate with the onset of the stressed vowel if the vowel is non-high? Where does the pitch fall actually occur in the stressed

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

syllable? Studies focusing on tonal characteristics of East Slavic are relatively rare, as tone was not thought to play a major role in East Slavic word prosody. But recent work by Nikolaev (2000, 2002, 2003) shows that pitch contours are contrastive in certain dialects for relatively young speakers. While there is reason to believe that tone is also functioning in the word prosody of the 'pretonic length' dialects as argued here (and possibly in dissimilative systems as well), we lack instrumental data to provide firm support for the proposal.

It is also important to extend instrumental studies of 'pretonic length' dialects beyond the domain of the word, in order to test the effects of sentence intonation. The East Slavic languages are intonational systems where focused words receive postlexical tone as well as increased duration and intensity. One task would be to identify potential intonational effects on the word prosody of the 'pretonic length' dialects (along the lines of work on Contemporary Standard Russian, e.g. Svetozarova 1982, Kodzasov 1996 and elsewhere, Odé 1989, Čekmonas 2001, Kasatkina 2005, and that of Lehiste & Ivič 1986 on Serbo-Croatian). Instrumental data obtained by Krasovickij (1999) on a dissimilative dialect near Mosal'sk reveal that phrasal accent has an effect on vowel duration, as is to be expected, but he did not look at the tonal characteristics of phrasal or word accent. Instrumental analyses of words in focus and non-focus contexts, under different intonational contours and in various positions within the intonational phrase, would be very helpful. Does word-initial falling pitch (HL) exhibit behaviour different from that of word-medial rising-falling pitch (LHL) for words under different phrasal intonations? Does intonational tone displace word tonal contours and if so, how? In general, instrumental verification of the word and sentence prosody of East Slavic 'pretonic length' dialects still remains for future work.

6.2 Final remarks

The interaction of stress and tone in the word prosody of the East Slavic dialects suggests that the pitch peak (H) is systematically aligned within the pretonic syllable in Type 1 dialects. It is supported by increased vowel duration, which facilitates a prolonged pitch rise to the pitch peak followed by a low tone on the stressed syllable (LH-L). Thus pretonic length is directly related to the presence of high tone in that syllable. In Type 2 dialects, the placement of high tone and the implementation of the pitch contour are controlled by segmental prominence. Segmental prominence here is based on a scale of vowel duration as determined by vowel height. In these dialects, high vowels do not lengthen. Where the pitch peak occurs depends on whether the potential carrier vowel is permitted to lengthen. The high tone is on the stressed syllable if it contains a non-high vowel that is intrinsically long; otherwise, it occurs on the pretonic vowel (L-HL and LH-L). A pretonic non-high vowel lengthens to accommodate the full pitch rise. In the related dissimilative dialects, vowels are not lengthened to accommodate high tone, so the contour is an abbreviated

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

one (HL). Where high tone occurs, it is controlled by vowel sonority, as determined by vowel height. Which vowels are considered high or non-high for purposes of pitch-contour implementation is a phonological decision in the dissimilative dialects.

Intrinsic vowel duration is exploited differently by the various dialects. It may be enhanced, as in the 'pretonic length' dialects, or it may be treated as a sonority requirement, as in the dissimilative dialects, for purposes of high-tone association. Vowel duration also plays a role in the neutralisation of vowel contrasts, but it is not always a question of neutralisation being motivated by reduced duration. In Type 2a Belarusian dialects with no *akan'e*, the contrast between /ɔ/ and /a/ is maintained in pretonic position ([dvɔːˈru, zaːˈvod]). In Type 2b Ukrainian *akan'e* dialects this contrast is neutralised ([dvaːˈru, zaːˈvod]). But in both types the pretonic vowel is lengthened. Neutralisation to a full vowel [a] in immediately pretonic position is a different process than neutralisation to [ə], [i] or [a] elsewhere. As there is no question that increased duration and vowel neutralisation co-occur in immediately pretonic position in these dialects, additional acoustic data and quantitative studies on their vowel properties (following work on CSR by Padgett & Tabain 2003) would be especially welcome.

In the dialects discussed, tone placement specifically creates a mismatch between tone and stress prominence, a typologically rare situation. The reasons for this are most likely historical (peak retraction), but the resulting typology is one that has not been discussed much in the literature. The prediction is that such a system would be unstable (cf. van der Hulst 1999: 80 on restricted tone systems), and dialect typology may represent historical change. At the same time, this prosody has been stable for the dialects in question for at least several centuries. Language change is observed in Type 2 dialects to be fairly recent and it does not hold for all speakers. As expected, change favours the coincidence of prominence markers. Either stress retracts onto pretonic long vowels and they subsequently shorten, e.g. [nɔːˈʃu] 'I carry' becomes [ˈnɔʃu], or pretonic length is lost and stress remains in its original position, e.g. [nɔːˈʃu] becomes [naˈʃu], as it is in neighbouring dialects and standard Belarusian (Vajtovič 1972: 28). But dialects with 'pretonic length' still exist, and pose an interesting problem for prosodic theory.

Pretonic length in the East Slavic dialects is said to be motivated by the tonal contour, not *vice versa*. In other words, there is no claim that increased phonetic duration is necessarily accompanied by a pitch contour; rather, it is the mapping of the high tone on a pretonic syllable that may require extra duration. This does not prevent increased duration in other positions of the word (aside from immediately pretonic) in 'pretonic length' dialects, and there are cases of word-initial strengthening in the Upper Snov Basin dialects with no concomitant pitch rise noted: Belarusian [hɔːdoˈvala] 'she fed, nursed', [mɔːloˈdaja] 'young (FEM SG)' (Vajtovič 1972: 24). Nor does stress and tone mapping with concomitant vowel lengthening preclude the existence of dialects with pretonic length

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

and no tonal contours. Such cases are found in some dissimilative *akan'e* dialects of Belarus and Russia (e.g. Stroganova 1955, Burova & Kasatkin 1977, Čekmonas 1980, 1987, Kasatkina & Ščigel' 1996), and researchers do not mention any 'musical' characteristics of these dissimilative dialects. If the tonal contour here is primarily associated with the stressed syllable (so long as intrinsic vowel duration permits its expression), then it may, in effect, be perceived as stress. There are even dissimilative *akan'e* dialects in north-western Belarus with an alternation in pretonic vowel duration dependent on the nature of the following stressed vowel, but for which no pitch contour has been recorded (Čekmonas 1980: 67, 1987).

Finally, it was suggested that the association of stress and tone across related dialects shows a range from less close to closer affiliation between pitch contours and vowel quality. A non-contrastive tonal contour that becomes very closely aligned with the stressed syllable could be perceived as stress, as it apparently is in many dissimilative *akan'e*/*jakan'e* dialects. A non-contrastive tonal contour that is systematically distributed over two syllables independent of vowel quality, as in Type 1 dialects, could become even more independent, in which case it might be reinterpreted as phrasal intonation. This is, in fact, reported to be the case for dialects in the vicinity of the archaic Vladimir-Volga Basin group within the Central Russian dialect zone (Al'muxamedova 1970), where the phrasal HL contour has H aligned with the pretonic syllable and L anchored to stress. Recent findings of Kasatkina (2005: 33) on the Moscow variant of CSR confirms it to be a dissimilative *akan'e* type: there is an alternation in the length of the immediately pretonic vowel that depends on the nature of the stressed vowel. Kasatkina (2005: 39) found that pretonic length 'was usually accompanied by a *raising* of the pitch on the *pretonic* vowel, while the pitch on the stressed vowel was lowered'. She attributes this pronunciation to phrasal prosody, and speculates that it may be the preservation of an archaic type of word prosody found in Russian dialectal material and in Old Moscow speech (2005: 43). That a non-contrastive tonal word contour in some dialects might become a phrasal contour in other dialects is not entirely unexpected.

REFERENCES

Al'muxamedova, Z. M. (1970). Iz nabljudenij nad povolžskoj intonaciej. In V. M. Markov (ed.) *Voprosy grammatičeskogo stroja russkogo jazyka*. Kazan': Izdatel'stvo Kazanskogo Universiteta. 21–35.

Al'muxamedova, Z. M. (ed.) (1985). *Gradacionnaja fonologija jazyka i prosodija slova russkoj dialektnoj reči*. Kazan': Izdatel'stvo Kazanskogo Universiteta.

Al'muxamedova, Z. M. & R. E. Kul'šaripova (1980). *Redukcija glasnyx i prosodija slova v okajuščix russkix govorax*. Kazan': Izdatel'stvo Kazanskogo Universiteta.

AUM (1984–1988). *Atlas ukrajins'koji movy*. 3 vols. Compiled by I. H. Matvijas *et al*. Kyiv: Naukova Dumka.

Avanesov, R. I. (1927). O govore Perejaslavl'-Zalesskogo ujezda Vladimirskoj gubernii. *Trudy postojannoj komisii po dialektologii russkogo jazyka* 9. Leningrad: Akademija Nauk SSSR. 67–78.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

Avanesov, R. I. (ed.) (1957). *Atlas russkix narodnyx govorov central'nyx oblastej k vostoku ot Moskvy*. Moscow: Akademija Nauk SSSR.
Avanesov, R. I. & V. G. Orlova (eds.) (1965). *Russkaja dialektologija*. 2nd edn. Moscow: Nauka.
Barnes, Jonathan (2002). *Positional neutralization: a phonologization approach to typological patterns*. PhD dissertation, University of California, Berkeley.
Beckman, Mary E. (1986). *Stress and non-stress accent*. Dordrecht: Foris.
Bethin, Christina Y. (1994). On the phonology of the Neo-Štokavian accent retraction in Serbian and Croatian. *Die Welt der Slaven* **39**. 277–296.
Bethin, Christina Y. (2005). On pretonic length in Belarusian and Ukrainian Nadsnovs'ki dialects. In Steven Franks, Frank Y. Gladney & Mila Tasseva-Kurktchieva (eds.) *Formal approaches to Slavic linguistics 13: the South Carolina meeting*. Ann Arbor: Michigan Slavic Publications. 52–67.
Bila, O. S. (1970). Dovhi holosni v zoni ukrajins'ko-bilorus'kyx miždialektnyx kontaktiv. In V. I. Hilelax (ed.) *Praci XIII respublikans'koji dialektolohičnoji narady: tezy dopovidej*. Kyiv: Naukova Dumka. 245–257.
Bila, O. S. [Belaja, A. S.] (1974). K xarakteristike kvantitativno-prosodičeskix različij v Nadsnovskix govorax na Černigovščine. In R. I. Avanesov, S. B. Bernštejn, S. K. Požaritskaja & F. P. Filin (eds.) *Obščeslavjanskij lingvističeskij atlas: materialy i issledovanija, 1971*. Moscow: Nauka. 22–31.
Bondarko, L. V. (1977). *Zvukovoj stroj sovremennogo russkogo jazyka*. Moscow: Prosveščenie.
Bondarko, L. V., L. A. Verbitskaja & L. R. Zinder (1966). Akustičeskie xarakteristiki bezudarnosti. In V. V. Ivanov (ed.) *Strukturnaja tipologija jazykov*. Moscow: Nauka. 56–64.
Broch, Olaf (1916). *Govory k zapadu ot Mosal'ska*. Petrograd: Imperatorskaja Akademija Nauk.
Brovčenko, T. O. (1969). *Slovesnyj naholos v sučasnij ukrajins'kij movi: eksperymental'noe doslidžennja*. Kyiv: Naukova Dumka.
Browne, Wayles & James McCawley (1973). Serbo-Croatian accent. In Erik C. Fudge (ed.) *Phonology: selected readings*. Harmondsworth: Penguin. 330–335. First published 1965 as: Srpskohrvatski akcenat. *Zbornik za Filologiju i Lingvistiku* **8**. 147–151.
Bruce, Gösta (1977). *Swedish word accents in sentence perspective*. Lund: Gleerup.
Burova, E. G. & L. L. Kasatkin (1977). Čuxlomskoe akan'e. In R. I. Avanesov, Ju. S. Azarx, L. N. Bulatova & V. V. Ivanov (eds.) *Dialektologičeskie issledovanija po russkomu jazyku*. Moscow: Nauka. 64–85.
Čekmonas, V. N. [Čekman, V. N.] (1980). O ritmičeskoj strukture slova v severo-zapadnom belorusskom govore d. Goreviči Novogrudskogo r-na. *Slavia Orientalis* **29**. 65–72.
Čekmonas, V. N. (1987). Territorija zaroždenija i etapy razvitija vostočnoslavjanskogo akanja v svete dannyx lingvogeografii. *Russian Linguistics* **11**. 335–349.
Čekmonas, V. N. (2001). K uzučeniju vokalizma govorov Pskovščiny. *Voprosy Russkogo Jazykoznanija* **9**. 43–85.
Crosswhite, Katherine (1999). *Vowel reduction in Optimality Theory*. PhD dissertation, UCLA. Published 2001, New York & London: Routledge.
DABM (1963). *Dyjalektalahičny atlas belaruskaj movy*. 2 vols. Compiled by R. I. Avanesov, K. K. Krapiva & Ju. F. Mackevič. Minsk: Akademija Nauk Belaruskaj SSR.
DARJa (1986). *Dialektologičeskij atlas russkogo jazyka*. Vol. 1: *Fonetika*. Edited by R. I. Avanesov & S. V. Bromlej. Moscow: Nauka.
Davis, Philip W. (1970). A classification of dissimilative jakan'e dialects of Russian. *Orbis* **19**. 360–376.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

Durnovo, Nikolaj (1914). Otčet ekspedicii dlja opredelenija granicy okanja i akanja. *Russkij Filologičeskij Vestnik*. **71**. 363–382.
Dybo, V. A. & S. L. Nikolaev (1998). Novye dannye i materialy po balto-slavjanskoj akcentologii: problemy slavjanskogo jazykoznanija. In V. A. Dybo (ed.) *Tri doklada k XII meždunarodnomu s''jezdu slavistov*. Moscow: RAN. 5–70.
Engstrand, Olle (1995). Phonetic interpretation of the word accent contrast in Swedish. *Phonetica* **52**. 171–179.
Engstrand, Olle (1997). Phonetic interpretation of the word accent contrast in Swedish: evidence from spontaneous speech. *Phonetica* **54**. 61–75.
Flemming, Edward S. (1995). *Auditory representations in phonology*. PhD dissertation, UCLA. Published 2002, London & New York: Routledge.
Gordon, Matthew (2002). A phonetically driven account of syllable weight. *Lg* **78**. 51–80.
Gussenhoven, Carlos & Gosta Bruce (1999). Word prosody and intonation. In van der Hulst (1999b). 233–271.
Halle, Morris (1965). Akan'e: the treatment of unstressed, nondiffuse vowels in southern Great Russian dialects. In Witold Taszycki (ed.) *Symbolae Linguisticae in Honorem Georgii Kuryłowicz*. Wrocław: Polska Akademia Nauk. 103–109.
Hulst, Harry van der (1999a). Word accent. In van der Hulst (1999b). 3–115.
Hulst, Harry van der (ed.) (1999b). *Word prosodic systems in the languages of Europe*. Berlin & New York: Mouton de Gruyter.
Kasatkin, L. L. (ed.) (1989). *Russkaja dialektologija*. 2nd revised edn. Moscow: Prosveščcenie.
Kasatkin, L. L. (1999). Predudarnyj vokalizm sovremennyx mosal'skix govorov, opisannyx v načale XX v. O. Brokom. In L. L. Kasatkin (1999). *Sovremennaja russkaja dialektnaja i literaturnaja fonetika kak istočnik dlja istorii russkogo jazyka*. Moscow: Nauka & Škola 'Jark'. 434–448.
Kasatkina, R. F. (1996a). Mežslogovaja assimiljacija glasnyx v russkix govorax. In Nikolaeva (1996). 207–221.
Kasatkina, R. F. (1996b). Srednerusskie govory i ritmika slova. In Nikolaeva (1996). 222–235.
Kasatkina, R. F. (2005). Moskovskoe akan'e v svete nekotoryx dialektnyx dannyx. *Voprosy Jazykoznanija* **53:2**. 29–45.
Kasatkina, R. F. & E. V. Ščigel' (1995). Assimiljativnoe-dissimiljativnoe akan'e. In L. L. Kasatkin (ed.) *Problemy fonetiki*. Vol. 2. Moscow: Prometej. 295–309.
Kasatkina, R. F. & E. V. Ščigel' (1996). Osobennosti prosodii slova v južnorusskix govorax. In Nikolaeva (1996). 236–255.
Keating, Patricia A. (1983). Comments on the jaw and syllable structure. *JPh* **11**. 401–406.
Kodzasov, S. V. (1996). Zakony frazovoj akcentuacii. In Nikolaeva (1996). 181–204.
Krasovickij, A. M. (1999). Prosodičeskie xarakteristiki slova v govorax s dissimiljativnym akanem. In R. F. Kasatkina (ed.) *Problemy fonetiki*. Vol. 3. Moscow: Nauka. 187–195.
Kryvicki, A. A. (1959). Fanetyčnyja asablivasci adnoj z havorak poudnja Belarusii. *Praci instytuta movaznaustva AN BSSR* **6**. Minsk: Akademija Nauk Belaruskaj SSR. 98–104.
Kurylo, O. (1924). *Fonetyčni ta dejaki morfolohični osoblyvosti hovirky sela Xorobryčiv davniše Horodnjans'koho povitu, teper Snovs'koji okruhy na Černihivščyni*. Kyiv: Vseukrajins'ka Akademija Nauk.
Kurylo, O. (1928). Do pytannja pro umovy rozvytku dysymiljatyvnoho akannja. *Zapysky istoryčno-filolohičnoho viddilu UAN* **16**. 48–72.
Kuznetsov, V. B., Arvo Ott & A. V. Ventsov (1987). Inherent vowel duration in Russian: production and perception data. In T. Gamkrelidze (ed.) *Proceedings of*

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

the 11th International Congress of Phonetic Sciences. Vol. 5. Tallinn: Academy of Sciences of the Estonian SSR. 366–369.
Lehiste, Ilse (1970). *Suprasegmentals*. Cambridge, Mass.: MIT Press.
Lehiste, Ilse & Pavle Ivić (1986). *Word and sentence prosody in Serbocroatian*. Cambridge, Mass.: MIT Press.
Lindblom, Björn (1963). Spectrographic study of vowel reduction. *JASA* **35**. 1773–1781.
Matusevič, M. I. (1976). *Sovremennyj russkij jazyk : fonetika*. Moscow: Prosveščenie.
Nazarova, T. V. (1977). Akan'e v ukrajinskix govorax. In R. I. Avanesov, S. B. Bernštejn, G. P. Klepikova & F. P. Filin (eds.) *Obščeslavjanskij lingvističeskij atlas : materialy i issledovanija, 1975*. Moscow: Nauka. 211–260.
Nikolaev, S. L. (1995). Novye dannye o vostočnoslavjanskom vokalizme i prosodii. *Russian Linguistics* **19**. 349–370.
Nikolaev, S. L. (1996). Histoire d'O. In A. Gippijs, T. M. Nikolaeva & V. N. Toporov (eds.) *Rusistika, Slavistika, Indoevropeistika : sbornik k 60-letiju Andreja Anatol'eviča Zaliznjaka*. Moscow: Indrik. 203–242.
Nikolaev, S. L. (2000). Refleksy praslavjanskix tonov v vostočnoslavjanskix jazykax. *Balto-slavjanskie issledovanija 1998–99*. Moscow: Indrik. 83–113.
Nikolaev, S. L. (2002). Nekotorye rezul'taty instrumental'nogo izučenija fonetiki i prosodii vostočno-slavjanskix govorov. In L. E. Kalnyn', M. I. Ermakova & G. P. Klepikova (eds.) *Issledovanija po slavjanskoj dialektologii*. Vol. 8. Moscow: RAN. 142–167.
Nikolaev, S. L. (2003). Novye dannye o fonetike i prosodii vostočnoslavjanskix govorov. In *Slavjanskoe jazykoznanie : XIII Meždunarodnyj s''jezd slavistov, Ljubljana 2003. Doklady rossijskoj delegacii*. Moscow: RAN. 432–448.
Nikolaeva, T. M. (ed.) (1996). *Prosodičeskij stroj russkoj reči*. Moscow: RAN.
Odé, Cecilia (1989). *Russian intonation : a perceptual description*. Amsterdam: Rodopi.
Ohala, John J. (1978). Production of tone. In Victoria A. Fromkin (ed.) *Tone : a linguistic survey*. New York: Academic Press. 5–39.
Ohala, John J. & William G. Ewan (1973). Speed of pitch change. *JASA* **53**. 345.
Padgett, Jaye & Marija Tabain (2003). Adaptive dispersion theory and phonological vowel reduction in Russian. Ms, University of California, Santa Cruz & Macquarie University, Sydney.
Pšeničnova, N. N. (1996). *Tipologija russkix govorov*. Moscow: Nauka.
Riad, Thomas (1998). Towards a Scandinavian accent typology. In Wolfgang Kehrein & Richard Wiese (eds.) *Phonology and morphology of the Germanic languages*. Tübingen: Niemeyer. 77–109.
Šaxmatov, A. A. (1915). *Očerk drevnejšego perioda istorii russkogo jazyka*. Petrograd: Imperatorskaja Akademija Nauk.
Schepman, Astrid, Robin Lickley & D. Robert Ladd (2006). Effects of vowel length and 'right context' on the alignment of Dutch nuclear accents. *JPh* **34**. 1–28.
Sinjavs'kyj, O. (1934). Zamitka pro movu s. Ljubeča na Černihivščyni. *Movoznavstvo* **1**. 91–97.
Sluijter, Agaath M. C. & Vincent J. van Heuven (1996). Spectral balance as an acoustic correlate of linguistic stress. *JASA* **100**. 2471–2485.
Steriade, Donca (1994a). Licensing by cue. Ms, UCLA.
Steriade, Donca (1994b). Positional neutralization and the expression of contrast. Ms, UCLA.
Steriade, Donca (2000). Paradigm uniformity and the phonetics–phonology boundary. In Michael B. Broe & Janet B. Pierrehumbert (eds.) *Papers in laboratory phonology V : acquisition and the lexicon*. Cambridge: Cambridge University Press. 313–334.
Stroganova, T. G. (1955). Odna iz osobennostej južnorusskogo vokalizma. *Voprosy jazykoznanija* **1955:4**. 94–103.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press

Sundberg, John (1979). Maximum speed of pitch changes in singers and untrained subjects. *JPh* **7**. 71–79.
Svetozarova, N. D. (1982). *Intonacionnaja sistema russkogo jazyka*. Leningrad: Izdatel'stvo Leningradskogo Universiteta.
Timberlake, Alan (1993). Isochrony in Late Common Slavic. In Robert A. Maguire & Alan Timberlake (eds.) *American contributions to the 11th International Congress of Slavists, Bratislava, August–September 1993: literature, linguistics, poetics*. Columbus, Oh.: Slavica. 425–439.
Toc'ka, N. I. (1966). Pro tryvalist' holosnoho jak odyn iz komponentiv naholosu. *Visnyk Kyjivs'koho Universytetu* **8**. 87–93.
Toc'ka, N. I. (1969). Zvukova xarakterystyka sučasnoji ukrajins'koji literaturnoji movy. In I. K. Bilodid (ed.) *Sučasna ukrajins'ka literaturna mova: fonetyka*. Kyiv: Naukova Dumka. 50–130.
Toc'ka, N. I. (1970). Nenahološeni alofony holosnyx fonem ukrajins'koji literaturnoji movy. *Movoznavstvo* **4:5**. 21–30.
Vajtovič, N. T. (1968). *Nanaciskny vakalizm narodnyx havorak belarusi*. Minsk: Navuka i Texnika.
Vajtovič, N. T. [Vojtovič, N. T.] (1972). K voprosu o putjax razvitija akan'ja v vostočnoslavjanskix jazykax. In R. I. Avanesov, S. B. Bernštejn, S. K. Požarickaja & F. P. Filin (eds.) *Obščeslavjanskij lingvističeskij atlas: materialy i issledovanija, 1970*. Moscow: Nauka. 17–39.
Vysotskij, S. S. (1967). Opredelenie sostava glasnyx fonem v svjazi s kačestvom zvukov v severnorusskix govorax. In L. L. Kasatkin, O. N. Moraxovskaja & T. G. Stroganova (eds.) *Očerki po fonetike severnorusskix govorov*. Moscow: Nauka. 5–82.
Vysotskij, S. S. (1973). O zvukovoj strukture slova v russkix govorax. In Ju. S. Azarx, S. V. Bromlej & L. N. Bulatova (eds.) *Issledovanija po russkoj dialektologii*. Moscow: Nauka. 17–41.
Westbury, J. R. & P. A. Keating (1980). Central representation of vowel duration. *JASA* **67**. Suppl. 1. 37.
Zaxarova, K. F. (1970). Vostočnye srednerusskie govory. In V. G. Orlova (ed.) *Obrazovanie severnorusskogo narečija i srednerusskix govorov*. Moscow: Nauka. 314–391.
Zec, Draga (1999). Footed tones and tonal feet: rhythmic constituency in a pitch-accent language. *Phonology* **16**. 225–264.
Zhang, Jie (2002). *The effects of duration and sonority on contour tone: typological survey and formal analysis*. New York & London: Routledge.
Zhang, Jie (2004). The role of contrast-specific and language-specific phonetics in contour tone distribution. In Bruce Hayes, Robert Kirchner & Donca Steriade (eds.) *Phonetically based phonology*. Cambridge: Cambridge University Press. 157–190.
Zlatoustova, L. V. (1954). Dlitel'nost' glasnyx i soglasnyx zvukov russkogo jazyka. *Učenie Zapiski Kazanskogo Gosudarstvennogo Universiteta* **114**. 99–123.
Zlatoustova, L. V. (1981). *Fonetičeskie edinicy russkoj reči*. Moscow: Izdatel'stvo Moskovskogo Universiteta.
Žylko, F. T. (1953). Perexidni hovirky vid ukrajins'koji do bilorus'koji movy v pivnično-zaxidnyx rajonax Černihivščyny. *Dialektolohičnyj Bjuleten'* **4**. 7–20.

https://doi.org/10.1017/S0952675706000868 Published online by Cambridge University Press