Interactions of tone and stress in Standard Serbian: phonological and phonetic evidence

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The system of pitch accents in Standard Serbian is traditionally described in terms of two pitch accent types, 'falling' and 'rising', each associated with stress and a characteristic pitch contour, making this a hybrid prosodic system (Lehiste and Ivić 1986). Previous analyses were either predominantly concerned with the lexical and distributional properties of the system, without properly incorporating its phonetic aspects (Browne and McCawley 1965, Inkelas and Zec 1988, Zec 1993, 1999, Bethin 1998); or relied exclusively on the phonetic facts, without incorporating the properties of the phonological patterning (Godjevac 2000, Smiljanić 2002). Our goal is to bridge this gap. We propose an Optimality Theory analysis, fully informed by both the phonetic and the phonological aspects of this pitch accent system.

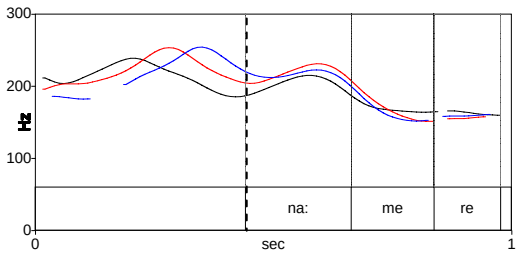
The realization of the two pitch accents varies considerably across regional dialects. Our focus will be on the Belgrade dialect, in which the 'falling' and 'rising' pitch accents are phonetically realized as in (1). Following Zec and Zsiga (2008), we identify several phonetic properties as relevant for our analysis. First, it is crucial to note that the stressed syllable and the syllable with the highest pitch coincide in the 'falling', but not in the 'rising' accents; in the latter case, the highest pitch occurs on the syllable immediately following the stressed one. Next, the pitch contours of the two pitch accents have different shapes: the 'rising' pitch accent is characterized by a pitch plateau that extends over the stressed syllable, with the pitch maximum on the immediately following syllable. No systematic pitch plateau is detected in the 'falling' accents. In addition to these phonetic properties, crucial for our analysis are the phonological aspects of the system. First, the two pitch accents differ in their phonological distribution. The 'falling' accents, but not the 'rising' ones, occur on monosyllables; and the stressed syllable of a 'falling' accent may only coincide with the initial syllable of a polysyllabic word, while the stressed syllable of a 'rising' accent may coincide with any syllable of a polysyllable other than the final. Second, following earlier phonological accounts, we propose that both pitch accents can be represented in lexical forms; and that the most appropriate representation is a linked High tone (cf. Browne and McCawley 1965, Inkelas and Zec 1988). Thus, the lexical representations of the forms in (1) are as in (2), with the High linked to the first syllable in the 'falling' accent, and to the second syllable in the 'rising' accent.

We propose the following constraints to account for the distributions of both tone and stress in this hybrid system. Assuming that a hybrid system yields hybrid representations, we propose that each of the two prosodic components characterizes a head of the word. The tonal head, HEAD-TONE, coincides with the syllable linked to the lexical High, as in (4), while the metrical head, HEAD-STRESS, is subject to the alignment constraint in (5). A word ideally should have a single head (8), but other constraints may overrule. As the High is lexically specified, HEAD-TONE is not mobile, due to the faithfulness constraint in (6). Although the left alignment of HEAD-STRESS is heavily restricted by constraint (7), it is crucially responsible for the occurrence of multiple heads. As shown in (3), the two heads coincide only in forms with a High linked to an initial syllable. This yields the phonological difference between the 'falling' and 'rising' accents, and a straightforward account of pitch accent distribution. In our analysis, a 'falling' accent arises when the loci of stress and tone coincide, and a 'rising' accent arises when they do not coincide. Crucially, the lexical Highs provide a phonetic pitch target. They correspond directly to the highest phonetic pitch. The phonology of the system thus accounts for the pitch maxima for both accents, obviating the need for positing surface pitch targets, as in Godjevac (2000) and Smiljanić (2002).

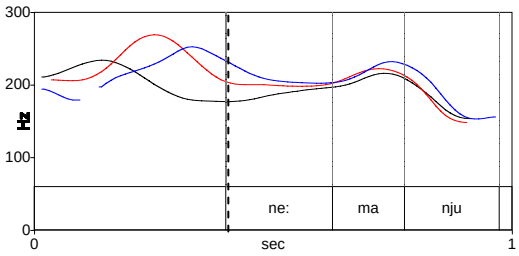
Finally, there is evidence for positing constraint (9), which requires that any head of the prosodic word (HEAD-STRESS or HEAD-TONE) has to be associated with a High tone. In forms with 'falling' accents, this constraint is satisfied by the fact that HEAD-STRESS coincides with HEAD-TONE. Satisfying this constraint in forms with 'rising' accents is less than straightforward. An insight is provided by the lexically toneless forms (typical for tonal systems), which are realized with stress on the initial syllable (due to (5)), accompanied by a High tone, as in (12). This suggests that constraint (9) is active in the prosodic system, causing in this case a DEP violation. But if HEAD-STRESS in 'rising' accents were supplied with a High, both heads would be linked to Highs, incurring an OCP violation (10). The pitch plateau on the HEAD-STRESS in (1B) should be interpreted in this light: as a failure to insert a High due to the ranking OCP >> HEAD/H. What happens instead is that the constraint (11) takes over (cf. de Lacey 2002), inserting a Low tone, realized here as a steady low plateau.

(1) Realization of 'falling' (A) and 'rising' (B) accents, with varied preceding contexts. Pitch tracks are aligned at the beginning of the target word (dotted line). The initial syllable is stressed in both cases.

A. 'falling' accent



B. 'rising' accent



(2) Lexical forms:

'falling'	'rising'
n a m e r e	n e m a nj a
|	|
H	H
'intentions'	'proper name'

(3) HEAD-TONE = [ ]; HEAD-STRESS = { }

'falling'	'rising'
{[n a]} m e r e	{n e} [m a] nj a
|	|
H	H

(4) HEAD-TONE: The tonal head of the prosodic word coincides with the syllable linked to a High tone.
(5) HEAD-STRESS: The metrical head of the prosodic word is aligned with its left edge.
(6) IDENT-H: Correspondent tones must be identical.
(7) HEAD ADJACENCY: Multiple heads of a prosodic word should be contiguous.
(8) SINGLE HEAD: A prosodic word should have at most one head.
(9) HEAD/H: Head of the prosodic word is associates with a High tone.
(10) OCP: No High tones on contiguous syllables.
(11) HEAD/L: Head of the prosodic word is associates with a Low tone.
(12) Toneless form

lexical form: d e v e r 'brother in law' surface form: {[d e]} v e r
| |
H

References:

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