Phonological association of tone. Phonetic implications in West Swedish and East Norwegian

Tomas Riad1 and My Segerup2
1Department of Scandinavian languages, Stockholm
2Centre for languages and literature, Lund University

Abstract
This paper looks for preliminary phonetic evidence in support of a phonological difference between tonal structure in West Swedish (Göteborg) and East Norwegian (Oslo) compounds that occasions a distributional difference between tonal accents in the two dialects (Riad 1998, 2006). We propose that the chief difference concerns the phonological association of the so-called prominence L tone in the HLH% sequence. We found a tendency for the L minimum to occur further to the left in East Norwegian, than in West Swedish, in accordance with the prediction.

Introduction
The intonational affinity between West Swedish and East Norwegian is clear (Gårding & Stenberg 1990). The realization of tone accent is melodically very similar. In citation form an accent 2 word contains a HLH sequence, where the first H (lexical or postlexical) tone occurs on the main stressed syllable and the second H (boundary) tone is aligned with the right edge of the word. The second H marks the boundary of the intonation phrase, and also carries some of the focus function (Fretheim & Nilsen 1989). On the face of it, one might think that the two dialects are quite similar, and indeed they are categorized together in Gårding’s Scandinavian Accent Typology (1977). In fact, Gårding and Stenberg (1990) found that the two dialects are quite similar, apart from the pitch height in conjunction with the boundary H, which is markedly higher in East Norwegian than in West Swedish.

Nevertheless, there are a couple of facts that signal a bigger difference than meets the ear, and the point of this pilot study is to phonetically follow up on the proposal made for phonology in Riad (1998, 2003, 2006), and to prepare for a more thorough investigation.

Background
The chief reason to suspect that there is a grammatical difference in tonal structure between the two dialect areas is the distribution of tone accent in compounds and other structures containing more than one phonological stress. In Swedish dialects, except South Swedish, and in Norwegian dialects north of Trøndelag, pretty much all regular compounds get accent 2. In these cases, Accent 2 is assigned postlexically, by virtue of the prosodic constellation of two stresses within the structure. In the western and southern Norwegian dialects and in South Swedish, both accents occur in compounds and compound-like structures. In these cases, the assignment of tone accent is influenced by a combination of lexical, morphological and prosodic factors (cf. Withgott & Halvorsen 1988, Kristoffersen 1992 for Norwegian; cf. Bruce 1974, Delsing & Holm 1988, Riad 1998, 2003, 2006 for Swedish). This difference occasions an isogloss that cuts through the Scandinavian peninsula dividing dialects into either type. East Norwegian and West Swedish are on either side of it (for maps, cf. Riad 2003:125, 2005:23, 2006:40).

Hypotheses from phonology
In Riad (1998) it is proposed that the isogloss marks a difference in the tonal alignment of the ‘prominence tone’ in compounds and compound-like structures. We use the term ‘prominence tone’ in a function-neutral way here. It simply denotes the tone that follows the lexical/postlexical tone of accent 2. In the dialects at hand, it is the L tone between the two H tones. According to the original proposal (the ‘alignment hypothesis’), the difference lies in left-alignment of L in East Norwegian and left-and-right-alignment of L in West Swedish. Thus, in East Norwegian there is interpolation from L to the final H boundary tone, whereas in West Swedish the L tone spreads between the H tones, occasioning a tonal floor.
In this article, we assume an alternative hypothesis (assumed in Riad 2008) where the claim is that the difference between the types is really one of association (the ‘association hypothesis’). The phonological claim, then, is that general accent 2 in compounds and similar structures follows from tonal association to both the initial primary stress and the rightmost secondary stress. This is what we find in the eastern-northern area of Scandinavia. Conversely, in dialects that allow either tonal accent in compounds, there is only one association point, namely the initial primary stress. This is what we find in the western-southern area. The prediction for these latter dialects, then, is that they instantiate tone accent in much the same way in both simplex forms and compounds.

The representational difference between the two dialects is illustrated in Figure 1.

![Figure 1](image)

**Figure 1.** Schematic representations of the compound *sommarledigheten* ‘the summer vacation’ in Göteborg and Oslo. The contour is accent 2. The prominence tone is underscored (L). The stylized contours to the right give an idea of how these representations are expected to come out melodically.

### Predictions and expectations

As far as this pilot study is concerned, the chief prediction concerns East Norwegian. We expect the lowest point between the two H tones to be to the left rather than to the right. Just as in simplex forms in several other dialects, the L prominence tone should follow the initial H directly. From that point, there should be interpolation to the final H%, since the L tone neither spreads nor associates from or to any point further to the right. Hence, we expect the L pitch minimum (henceforth ‘L_{min}’) to be leftward.

In West Swedish, the expectation – under both the alignment and association hypotheses – is that we should see an intonation floor (low plateau) between the H tones. This makes no particular prediction regarding the location of the lowest point. In principle, it should quite possibly occur to the right. One possible difference between the alignment and association hypotheses is that L_{min} should not occur further to the right than the last stress under the association hypothesis.

At a general level, then, we expect the pitch contour between the H tones to be flatter in West Swedish than in East Norwegian.

### Method

In order to find preliminary support for a difference regarding the association/alignment of the L tone it is a good idea to look at long compounds. The longer the compound, the greater the opportunity for an unassociated contour to rise in East Norwegian. Conversely, if the last stress remains a relatively low point also in long West Swedish compounds, then that is an indication of association.

We have excerpted a number of compounds from four speakers in local radio programs in Göteborg (3 speakers) and Oslo (1 speaker). Excerpted forms were all in focus position (medial or final) such that they clearly contained the HLH contour within the compound. Our pitch analysis is carried out by means of Praat (Boersma & Weenink 2001). We marked the H points for each excerpted compound in the sound object window and then identified the lowest point between them. This can be conveniently done by combining visual inspection with the ‘move cursor to maximum/minimum pitch’ function in Praat. The lowest point was annotated ‘L_{min}’ on the point tier, and we also marked one more L point (outside of the syllable containing L_{min}), so as to get a reference point.

With these marks in place we get an idea of whether the L_{min} is rightward or leftward. Also, by comparing the low points we get an idea of the flatness of the floor or the steepness of the rise.

### Results

Pending permission, we cannot publish any of the pitch contours from the radio material. Instead, we present illustrative recordings of a Göteborg speaker in Figure 2 and of an Oslo speaker in Figure 3.
Proceedings, FONETIK 2008, Department of Linguistics, University of Gothenburg

Figure 2. Göteborg compound *exempelmeningar*, with $L^{\text{min}}$ in the last stressed syllable.

Figure 3. Oslo compound *samferdselsbyråd*, with $L^{\text{min}}$ in the second syllable.

In Tables 1 and 2, we give the list of the investigated compounds. In each compound, the syllable containing $L^{\text{min}}$ is underscored.

Table 1. Oslo. 9 tokens, one female speaker (FAn).

<table>
<thead>
<tr>
<th>word, $L^{\text{min}}$ underscored</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>granskingsrap, port’ne</td>
<td>the scrutiny reports</td>
</tr>
<tr>
<td>frem skrittspar, tiet a</td>
<td>the progress party</td>
</tr>
<tr>
<td>frem skrittspar, tiet b</td>
<td>the progress party</td>
</tr>
<tr>
<td>forer, spors, målet</td>
<td>the president question</td>
</tr>
<tr>
<td>sam, ferdsels, by, råd a</td>
<td>communications counsellor</td>
</tr>
<tr>
<td>sam, ferdsels, by, råd b</td>
<td>communications counsellor</td>
</tr>
<tr>
<td>ar, beids, til, synet</td>
<td>the work inspection</td>
</tr>
<tr>
<td>holde, plass’ne</td>
<td>the stations</td>
</tr>
<tr>
<td>heste, drosj’ne</td>
<td>the horse taxis</td>
</tr>
</tbody>
</table>

Table 2. Göteborg. 9 tokens, three male speakers (MAg 3, MBg 2, MCg 4).

<table>
<thead>
<tr>
<th>word, $L^{\text{min}}$ underscored</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>fot bollsfa, miljen</td>
<td>the football family</td>
</tr>
<tr>
<td>sen’or sidan</td>
<td>the seniors’ side</td>
</tr>
<tr>
<td>fot bolls, åskare</td>
<td>football lovers</td>
</tr>
<tr>
<td>dag, läget</td>
<td>day form</td>
</tr>
<tr>
<td>åsido, satta</td>
<td>set aside</td>
</tr>
<tr>
<td>ex, empel, meningar</td>
<td>sentence examples</td>
</tr>
<tr>
<td>be, tydelse, associa, tonen</td>
<td>meaning associations</td>
</tr>
<tr>
<td>menings, byggjad</td>
<td>syntax</td>
</tr>
<tr>
<td>obe, slut, samme</td>
<td>indecisive</td>
</tr>
</tbody>
</table>

Discussion

As seen, there is a clear tendency for the $L^{\text{min}}$ to occur to the left in the Oslo data. $L^{\text{min}}$ is also quite rightward, as a tendency, in the Göteborg data. In Oslo, the tone starts to rise immediately after the $L$. In long compounds containing several stresses, too, it keeps rising past the final stress. If there were an association point here, we would expect final stresses to be $L$. In Göteborg Swedish we find that the final stress is invariably low and whether it is the $L^{\text{min}}$ or not, there is clearly a tonal floor between the $H$ points. Thus, we conclude that it is worthwhile pursuing the association hypothesis with a fuller investigation.

Conclusion and prospects

One of the important tasks of phonology is to generate hypotheses for phonetics. In this pilot study, we have begun to follow up on such hypotheses regarding the tonal phonology of compounds in West Swedish and East Norwegian. In the follow-up investigation we plan to make our own recordings and see if the findings can be further substantiated. Regarding Göteborg, we hope to be able to clearly separate the predictions of the alignment hypothesis from those of the association hypothesis, by studying long compounds with the final stress at different distances from the right edge. Regarding Oslo, we hope to show that the last (though not necessarily final) stress in long compounds may be integrated into the final rise. We expect that using both normal and loud speaking mode as used by Segerup (2004) will be a good way of bringing out the prosodic profile of the structures investigated. As mentioned, East Norwegian also has tone accent 1 in compounds. In those cases the $L$ is associated to the main stressed
syllable, and we expect the rise to begin even earlier, and the following stresses to be integrated into the rising slope.

Acknowledgements
We wish to thank Sara Myrberg for comments on the text and Per Olav Heggtveit for providing us with the illustrative example of an Oslo compound for this article.

Notes
1. Note that the isogloss as such is independent of melodic differences regarding tone value.
2. The implications of the two hypotheses are less important for this pilot study, but they will be heeded in the follow-up study, where controlled materials will be recorded.
3. In Göteborg, the H% tone is often followed by a slight fall (Gårding & Stenberg 1990, Kuuronen 1999). Since the H% is very clearly in the final syllable, and we focus on the L tone before it, we will disregard the very end of the contour.

References


