

A comparative OT-analysis of tone in three East Norwegian dialects

Gjert Kristoffersen

University of Bergen

The analysis below complements and enlarges upon the analysis given in my paper “Dialect variation in East Norwegian tone”, published in *Tones and Tunes. Typological and Comparative Studies in Word and Sentence Prosody I*, edited by Tomas Riad and Carlos Gussenhoven (Berlin: Mouton de Gruyter 2007). For reasons of space, the full OT-analysis could not be published in the book. It is instead presented below, and should be read as a supplement to the published article. Note that some of the introductory sections double with passages in the article in order to make the text below coherent.

Motivation

The conclusion that is drawn in Kristoffersen (2007) is that neither the privativity nor the timing hypothesis can account directly for all the East Norwegian surface data presented. One possible conclusion would be that we are in fact dealing with different systems that require radically different analytical solutions. But we have seen that there are basic similarities between the systems that might go unnoticed if such a strategy were adopted. The property that can be generalized across the three dialects is the delayed-L effect, that is, L on the stressed syllable in accent 1 and L on the post-stress syllable in accent 2. A unified analysis that at the same time can account for the delayed L effect of all three dialects as well as for the presence of the privative H in UEN only, would clearly be superior to an analysis where the common delayed L effect is hidden behind an initial division into a “privativity” type and a “timing type”.

The basic assumptions of the analysis that follows are that the two accents are derived from the same underlying melody L* H%, and that the presence of an H on the stressed and an L on the post-stress syllable in accent 2 is caused by a markedness constraint that optimizes high tones on stressed syllables. In polysyllabic accent 1 this optimal distribution is blocked by the low tone being linked to the stressed syllable in the input.

The TBU in Urban East Norwegian

Mainly due to the fact that the tonal contrast is limited to main stressed syllable, some recent papers hold that the TBU in Scandinavian is the stressed syllable only (Gussenhoven 2004; Gussenhoven and Bruce 1999; Riad 2003). In opposition to this view, syllables and moras are held to be the relevant TBUs in this chapter. A central argument for this position is given below: The tonal grammar of Oppdal is difficult to account for without the mora as TBU.¹

The input melody

For both accents, one underlying (intonational) tune, L* H% is assumed, where the asterisk marks the L as the central tone that, subject to the relevant constraints, will be realized as near the stressed syllable as possible. Pre-linking of the L* to the stressed syllable derives *marked* polysyllabic accent 1.² Unmarked accent is derived by association and markedness constraints only, without pre-linked tones in the input. Input representations of a (near) minimal pair, [¹svim.ml], *svimmel* ‘dizzy’ vs. [²him.ml], *himmel* ‘sky’, are shown in Figure 9.

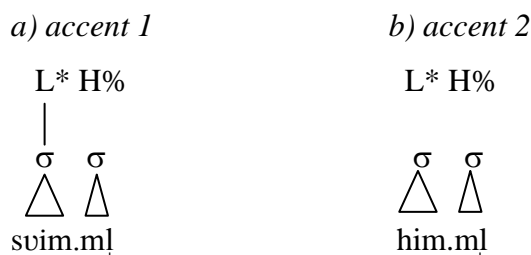


Figure 1: Input representations of accent 1 and accent 2

Constraints

The relevant constraints are given in Table 1.

¹ See Kristoffersen (2003) for another argument against the stressed syllable as TBU, related to the timing of the post-stress syllable with respect to the second tone of the melody.

² The notion of pre-linking an intonational tone may seem counter-intuitive, since intonation by implication is post-lexical. Even if mainstream OT rejects the level specific sub-grammars of Lexical Phonology, I admit that this poses a conceptual problem since pre-linking is not part of the grammar proper. One way of overcoming the problem would be to assume that the pre-linked L, although historically derived from intonation, is not part of the intonational tune in the synchronic grammar. When a form with an underlying L is subjected to the full, intonational tune in GEN, candidates with associated L* would be eliminated by the OCP in EVAL. This problem clearly needs more attention in future work.

Table 1: List of constraints

Constraint	Definition
a) ASSOCIATE-H%; RT:	H% is associated to the rightmost TBU in the accent phrase
b) ASSOCIATE-L* _{AP} :	L* is associated to some TBU in the accent phrase
c) ASSOCIATE-L* _{GRWd} :	L* is associated to some TBU within the grammatical word that heads the accent phrase
d) OCP-T:	Adjacent identical tones are prohibited
e) SPECIFY-T _{AP} :	A TBU within an accent phrase must be associated with a tone
f) MAXLINK-L*:	No removal of association lines to L*
g) *HD _{MAX} /L:	No low tones on maximal heads
h) *TONE	Tones are not part of the output

Accent 1 in polysyllabic words is marked

Accent 1 in polysyllabic words is the result of pre-linking L* to the stressed syllable in the input. In addition, a top-ranked faithfulness constraint, MAXLINK-L*, forbids dissociation of a pre-linked L*. Accent 1 in polysyllabic words thereby emerges as the marked option in the sense that part of the distribution of tones is encoded directly in the relevant lexical entries in order to avoid surface form with (unmarked) accent 2. This classification, where monosyllabic accent 1 and polysyllabic accent 2 are unmarked in opposition to marked, polysyllabic accent 1, represents a radical revision of the classification into unmarked accent 1 and marked accent 2 assumed in previous analyses based on privativity. It supports the analysis proposed in Lahiri, Wetterlin and Jönsson-Steiner (2005), where accent 1 is argued to be the marked member of the accentual contrast, although from a different analytical perspective than the one taken here.

Note one controversial point in the analysis. The boundary tone H% is assumed to link to the rightmost TBU of the domain, and *not* with the boundary, as assumed in e.g. Gussenhoven (2004: 124). The arguments for this will be given below under the Oppdal analysis.

Urban East Norwegian

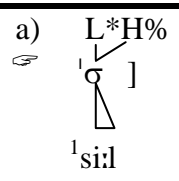
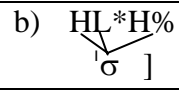
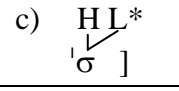
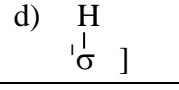
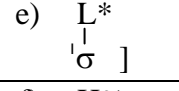
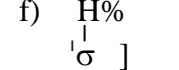
The constraint ranking assumed for UEN is given in (1).³

- (1) ASSOCIATE-H%; RT, ASSOCIATE-L*_{AP}, ASSOCIATE-L*_{GRWd}, SPECIFY-T_{AP}, OCP-T >>
 MAXLINK-L* >>>
 *HD_{MAX}/L >>
 *TONE

We first look at the derivation of monosyllabic inputs, given in Tableau 1. For space-saving reasons, OCP-T, MAXLINK-L*, SPECIFY-T_{AP}, TBU = σ and candidates violating them have been omitted. MAXLINK-L* will be introduced below, while the others will remain assumed. Here and in subsequent tableaux the relevant example given in Table 1 in Kristoffersen (2007) is inserted as part of the representation of the winning candidate.

In Tableau 1, candidates (a) and (b) are the only candidates that do not violate one of the top ranked constraints. Both violate *Hd_{MAX}/L, and (b) loses to candidate (a) on *TONE.

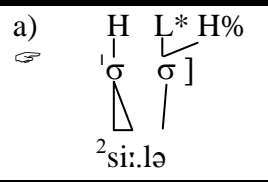
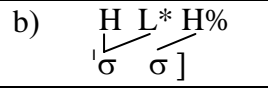
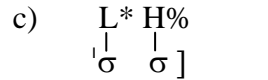
Tableau 1: UEN - Evaluation of monosyllabic input

L* H% σ]	ASSOCIATE- L* _{GRWd}	ASSOCIATE- L* _{AP}	ASSOCIATE- H%; RT	*HD _{MAX} /L	*TONE
a)  σ] si:l				*	**
b)  σ]				*	***!
c)  σ]			*!	*	**
d)  σ]	*!		*		*
e)  σ]			*!	*	*
f)  σ]	*!	*			*

³ The grammar presented here is a condensed and in some respects simplified version of the tonal grammar of UEN developed in Kristoffersen (2006).

Tableau 2 shows the evaluation of disyllabic domains with initial stress, i.e. the prototypical accent 2 environment. Due to the presence of the unstressed syllable, L* can be linked so that it meets the requirement of *HD_{MAX}/L in the winning candidate (a). Insertion of an epenthetic H on the stressed syllable in order to satisfy top-ranked SPECIFY-T_{AP} comes at no fatal cost, due to the fact that it is the only candidate that does not violate *HD_{MAX}/L. For space-saving reasons, only candidates that do not violate the top-ranked constraints are included in the tableaux that follow where these are not directly relevant for the evaluation at hand.

Tableau 2: UEN - Disyllabic domain with initial stress

L* H% σ σ]	TOP- RANKED	*HD _{MAX} /L	*TONE
a) 			***
b) 		*!	**
c) 		*!	*

In Tableau 3 candidates where a toneless, unstressed syllable appears before a word-final stressed syllable are evaluated. Due to the fact that the stressed syllable is final in its domain, we find accent 1 in parallel with monosyllabic words, see the evaluation in Tableau 1 above. As will become clear when we come to the discussion of NGbr below, the interesting point is whether there is an epenthetic H on the pre-stress syllable or not. Since inserting an H incurs a greater degree of violation of *TONE, candidate (a) with a toneless pre-stress syllable emerges as the winner.⁴

Another example of unmarked accent 1, where a clitic follows a monosyllabic stem, is shown in Tableau 4 below. I follow Lahiri et al. (2005) in assuming that the definite singular suffix, true to its historical origin, still functions as a clitic. This accounts for the fact that definite singular endings added to monosyllabic stems result in accent 1, even though the domain contains two syllables. The grammatical word boundary between the monosyllabic stem and the clitic precludes L* from associating with the post-stress syllable, due to top-

⁴ Candidates where L* is associated with the pre-stress syllable are ruled out by ASSOCIATE-L*_{AP}, see Kristoffersen (2006) for discussion.

ranked ASSOCIATE-L*_{GRWd}, since the grammatical word in this case is limited to the monosyllabic stem. Again, *TONE decides the winner.

Tableau 3: UEN - Disyllabic input with unstressed plus stressed syllable

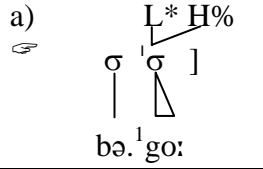
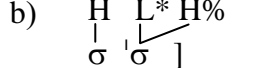
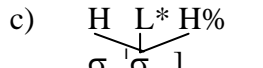
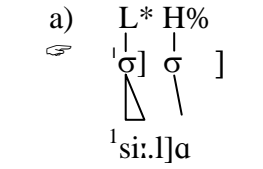
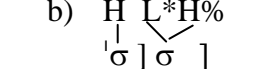
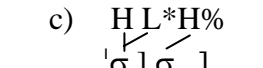
L* H% σ 'σ]	TOP- RANKED	*HD _{MAX} /L	*TONE
a) 		*	**
b) 		*	***!
c) 		*	***!

Tableau 4: UEN - Disyllabic input with monosyllabic, grammatical word plus clitic

L* H% 'σ] _{Gw} σ] _{AP}	TOP- RANKED	ASSOCIATE- L* _{GRWd}	*HD _{MAX} /L	NOTONE
a) 			*	**
b) 		*!		***
c) 			*	***!

Finally, in Tableau 5 a disyllabic input with pre-linked L is evaluated. Here the accent 2 candidate (c) violates MAXLINK-L* because the input link has been changed. Again, due to the fact that (b) violates *TONE to a lesser degree than (a), the accent 1 candidate wins. This completes the short sketch of the UEN tonal grammar. The important features of the analysis that will be extended to the two other dialects are summarized in (2).

Tableau 5: UEN - Marked accent 1 in polysyllabic domains

$\begin{array}{c} L^* H\% \\ \\ \sigma \sigma \end{array}$	TOP-RANKED	MAXLINK-L*	*HD _{MAX} /L	*TONE
a) $\begin{array}{c} L^* H\% \\ \quad \\ \sigma \quad \sigma \\ \triangle \quad \\ \text{si.lu} \end{array}$			*	**
b) $\begin{array}{c} H L^* H\% \\ \quad / \quad \\ \sigma \quad \sigma \end{array}$			*	***!
c) $\begin{array}{c} H L^* H\% \\ \quad / \quad \\ \sigma \quad \sigma \end{array}$		*!		***

(2)

1. Common input melody L*H%.
2. Monosyllabic accent 1 and disyllabic accent 2 are derived by means of ranked markedness and association constraints only, and therefore emerge as unmarked.
3. Accent 1 in domains where accent 2 would be the unmarked option, requires lexical pre-linking and protection by a faithfulness constraint, and therefore emerges as the marked member of the tonal accent contrast.

North Gudbrandsdal: Enhancement of L*

Contrasting NGbr with UEN

NGbr differs from UEN on one count only: In inputs with an unstressed anacrustic syllable preceding the stressed one, there is a high tone on the unstressed syllable in NGbr that is absent from the corresponding UEN form. Tableau 3 above shows the relevant UEN evaluation. It is the loser there, candidate (a) that represents the NGbr output. Since the two candidates tie on *HD_{MAX}/L, re-ranking with *TONE will not give us the desired result. We must therefore call on another constraint, whose ranking in UEN is not high enough to make its presence felt there. In NGbr, its higher ranking results in it being decisive in candidate selection, securing insertion of H on the pre-stress syllable. The constraint can be formalized in different ways. Here I choose the statement given in (3).

(3) FALL-TO-L*: A low T* is preceded by a high tone

Note that FALL-TO-L* will promote the presence of a high tone on an unstressed syllable. Hence it cannot be grounded in the marked/unmarked patterning between metrical structure and tones that is expressed by the constraints *HD/L and its converse *NON-HD/H (de Lacy 2002: 2). Rather, I propose that the motivating property of this constraint is its context, which is an immediately following low tone on a *stressed* syllable. If low tones on stressed syllables are more marked than high tones, it may have to do with perceptibility. Inserting a high tone before the low tone in these cases will cause a more pronounced fall towards the low tone. This will clearly improve the salience of an L as a stress-enhancing feature.

In the absence of corroborating evidence from other languages, this constraint admittedly has an ad-hoc flavour. But since we are dealing with a contrast between presence and absence of a tone on a pre-stress syllable, and since we lack evidence that all unstressed syllables outside accent phrases must be tonally specified in this specific dialect, we cannot simply appeal to a generalized version of SPECIFY-T which combined with the OCP will force the insertion of an H. FALL-TO-L* must be seen as a candidate constraint whose fate will be decided by the possible existence of parallel properties in other languages. Its general motivation lies in its function as enhancement of prominence marking low tones, which at the outset can be seen as less optimal in this function than a high tone.

Since FALL-TO-L* promotes the insertion of an H on the pre-stress syllable, it has to be ranked above *TONE. However, FALL-TO-L* can also be satisfied by the insertion of an H on the stressed syllable, thereby creating an ungrammatical contour, as can be seen from candidate (c) in Tableau 6 below. We therefore need a constraint that can distinguish between candidates (a) and (c) in the tableau. NOCONTOUR (Yip 2002: 83) forbids TBUs associated with more than one tone. In UEN, *TONE takes care of candidates with contours created by insertion of H, but since NGbr allows H-insertion to a slightly greater degree than UEN, NOCONTOUR makes its presence felt. In fact, in order to give the right result throughout the NGbr grammar, it must be ranked above FALL-TO-L*. This is not apparent from Tableau 6 below, but when monosyllabic inputs without a pre-stress syllable are evaluated, it is more important to avoid double contours on the single syllable than to allow for an initial H in addition to the L*H% melody in order to meet the requirements of FALL-TO-L*.

The difference between the two grammars then consists of FALL-TO-L* and NOCONTOUR being ranked high enough in NGbr to make their presence felt, while this is not the case in UEN. The constraint rankings in the two dialects are compared in (4).

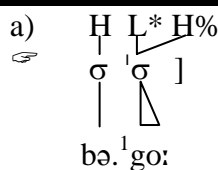
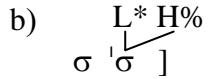
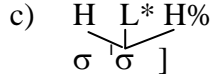
(4)

UEN: Top-Ranked >> MAXLINKL >> *HD_{MAX}/L >> *TONE >> ... (FALL-TO-L*)

NGbr: Top-Ranked >> MAXLINKL >> *HD_{MAX}/L >> NOCONTOUR >> FALL-TO-L* >>
 *TONE >> ...

The actual evaluation of the critical input type is shown in Tableau 6.

Tableau 6: NGbr - Disyllabic input with unstressed plus stressed syllable

L* H% σ 'σ]	TOP- RANKED	*HD _{MAX} /L	NO CONTOUR	FALL- TO-L*	*TONE
a)  bæ.¹go:		*	*		***
b)  σ 'σ]		*	*	*!	**
c)  σ 'σ]		*	**!		***

For all the other domain types reviewed in the section on UEN above, the NGbr outputs derived by the NGbr grammar are identical with the corresponding UEN outputs and therefore in accordance with the data.

Oppdal: The mora as TBU

Constraints

Oppdal represents the varieties spoken in the northern part of the East Norwegian region, Trøndelag, whose major city is Trondheim. Whether the pattern that we find in Oppdal generalizes to the whole region, cannot be ascertained at this point, but at least with respect to one important feature, the difference in melodic structure between unmarked monosyllabic and marked polysyllabic accent 1, descriptions of other Trøndelag dialects agree with the Oppdal facts: While monosyllabic accent 1 is characterized by a rise only, polysyllabic accent 1 consists of a fall within the stressed syllable in addition to the final rise (Kristoffersen 1992).

As we shall see, this follows directly from the assumption that the TBU is the mora instead of the syllable. The only difference between Oppdal and UEN is in fact that the

constraint TBU = μ supplants TBU = σ among the top-ranked constraints, and that NOCONTOUR is needed as equally ranked with *TONE.

Analysis

As above, we first look at monosyllabic domains. As can be seen from the relevant phonetic data discussed in Kristoffersen (2007), it is candidate (a) that most closely mirrors the rising F_0 contour shown there. The initial H that is present in the other candidates has no support in the phonetic facts. We see that the analysis developed for Urban East Norwegian above neatly identifies the grammatical candidate also in Oppdal. Since *HD_{MAX}/L is violated in all the candidates in the absence of any unstressed syllable following the stressed one, *TONE decides in favour of accent 1, i.e. candidate (a).

Tableau 7: Oppdal - Evaluation of monosyllabic input

	L* H% '(μ μ)]	TOP- RANKED	*HD _{MAX} /L	*TONE
a)	L* H% '(μ μ)] \ / ¹ si:l		*	**
b)	H L*H% '(μ μ)]		*	***!
c)	H L*H% '(μ μ)]		*	***!

Turning now to the unstressed plus stressed syllable domain type, it is also evident from the phonetic data presented in Kristoffersen (2007) that there is no H present on the pre-stress syllable. The evaluation is shown in Tableau 8. We see that candidate (a) emerges as winner because it violates *TONE to a lesser degree than its competitors. The three other candidates are faulted by the inserted H.

In the next domain type, disyllabic input where the final syllable is a clitic, the difference between unmarked, monosyllabic and marked polysyllabic accent 1 emerges. In addition NOCONTOUR manifests itself as a decisive constraint ranked as equal with *TONE. Since the grammatical word boundary blocks L* from being associated with the post-stress syllable due to ASSOCIATE-L*_{GRWD}, it must go to the stressed one. And since low tones on stressed syllables are penalized by *HD_{MAX}/L, association to only one of the moras is better than to both. Top ranked SPECIFY-T_{AP} requires a tone linked to the remaining mora in the stressed

syllable, and H on the first mora is the only option, since linking of L* to the initial and insertion of either H or L on the second mora would be eliminated by top-ranked OCP. The evaluation is shown in Tableau 9.

Tableau 8: *Oppdal - Disyllabic input with unstressed plus stressed syllable*

L* H% μ '(μ μ)]	TOP- RANKED	*HD _{MAX} /L	*TONE
a) $\begin{array}{c} \text{L}^* \text{ H}\% \\ \text{μ}'(\text{μ} \text{ μ})] \\ \swarrow \quad \searrow \\ \text{bə.}^1\text{go:} \end{array}$		*	**
b) $\begin{array}{c} \text{H} \quad \text{L}^* \text{ H}\% \\ \text{μ}'(\text{μ} \text{ μ})] \end{array}$		*	***!
c) $\begin{array}{c} \text{H} \quad \text{L}^* \text{ H}\% \\ \text{μ}'(\text{μ} \text{ μ})] \end{array}$		*	***!
d) $\begin{array}{c} \text{H L}^* \text{ H}\% \\ \text{μ}'(\text{μ} \text{ μ})] \end{array}$		*	***!

Tableau 9: *Oppdal - Disyllabic input with monosyllabic, grammatical word plus clitic*

L* H% '(μ μ)] _{GW} μ] _{AP}	TOP- RANKED	ASSOCIATE- L* _{GRWd}	*HD/L	*TONE	NO CONTOUR
a) $\begin{array}{c} \text{H} \quad \text{L}^* \quad \text{H}\% \\ \text{μ}'(\text{μ} \text{ μ})] \text{ μ }] \\ \swarrow \quad \downarrow \quad \searrow \\ \text{si:}^1] \text{a} \end{array}$			*	***	
b) $\begin{array}{c} \text{H} \quad \text{L}^* \text{ H}\% \\ \text{μ}'(\text{μ} \text{ μ})] \text{ μ }] \end{array}$		*		***	*!
c) $\begin{array}{c} \text{L}^* \quad \text{H}\% \\ \text{μ}'(\text{μ} \text{ μ})] \text{ μ }] \end{array}$			**!	**	

The winner in tableau 9 is candidate (a), where the HL-contour on the stressed syllable represents the fall shown in the phonetic data. Note that it is the difference in TBU that accounts for the difference with respect to UEN, where gradient violation of *HD_{MAX}/L is not possible due to the syllable being the TBU. The more faithful candidate (c) is therefore eliminated due to its double violation of this constraint. The accent 2 candidate (b) fails to satisfy top-ranked ASSOCIATE- L*_{GRWd}, and finally loses to (a) due to its violation of NOCONTOUR.

We now turn to the prototypical domain type for unmarked accent 2: disyllabic grammatical words with stressed syllable followed by an unstressed syllable. Also here we find a difference with respect to UEN, in that the initial H is sustained through the stressed syllable. The evaluation is shown in Tableau 10, where we see that candidate (a), where the epenthetic H is linked to both moras and L* is relegated to the post-stress mora wins because *HD_{MAX}/L is fully satisfied by this candidate only.

Tableau 10: Oppdal - Disyllabic domain with initial stress

	L* H%	TOP-RANKED	*HD _{MAX} /L	*TONE	NO CONTOUR
a)	$\begin{array}{c} \text{H} \quad \text{L}^* \text{ H}\% \\ \swarrow \quad \searrow \\ \text{'}(\mu \mu) \mu \text{'} \\ \swarrow \quad \searrow \\ \text{}^2 \text{si:l}\emptyset \end{array}$			***	*
b)	$\begin{array}{c} \text{H} \quad \text{L}^* \text{ H}\% \\ \swarrow \quad \searrow \\ \text{'}(\mu \mu) \mu \text{'} \\ \swarrow \quad \searrow \\ \text{}^2 \text{si:l}\emptyset \end{array}$		*!	***	
c)	$\begin{array}{c} \text{L}^* \quad \text{H}\% \\ \swarrow \quad \searrow \\ \text{'}(\mu \mu) \mu \text{'} \\ \swarrow \quad \searrow \\ \text{}^2 \text{si:l}\emptyset \end{array}$		**!	*	

Finally we look at the evaluation of disyllabic inputs that surface with accent 1 due to pre-linked L*.

Tableau 11: Oppdal - Accent 1 in polysyllabic domains

	L* H%	TOP-RANKED	MAXLINK-L*	*HD _{MAX} /L	*TONE	NO CONTOUR
a)	$\begin{array}{c} \text{H} \quad \text{L}^* \text{ H}\% \\ \swarrow \quad \searrow \\ \text{'}(\mu \mu) \mu \text{'} \\ \swarrow \quad \searrow \\ \text{}^1 \text{si:lu} \end{array}$			*	***	
b)	$\begin{array}{c} \text{H} \quad \text{L}^* \text{ H}\% \\ \swarrow \quad \searrow \\ \text{'}(\mu \mu) \mu \text{'} \\ \swarrow \quad \searrow \\ \text{}^1 \text{si:lu} \end{array}$		*!		***	*
c)	$\begin{array}{c} \text{L}^* \quad \text{H}\% \\ \swarrow \quad \searrow \\ \text{'}(\mu \mu) \mu \text{'} \\ \swarrow \quad \searrow \\ \text{}^1 \text{si:lu} \end{array}$			**!	**	

Since there is an initial fall in polysyllabic 1, L* must be pre-linked to the second mora of the stressed syllable, as shown in the input cell in Tableau 11. Since the accent 2 candidate fails

on MAXLINK-L* and (c) violates *HD_{MAX}/L to a greater degree, candidate (a) emerges as the winner.

While in NGbr and in UEN there is no initial H in this environment, the free, initial mora in Oppdal allows insertion of H in order to meet SPECIFY-T_{AP} and at the same time minimizing violation of *HD_{MAX}/L. This means that the difference in tonal melodies between UEN and NGbr, which both has L*H% in this environment, and Oppdal follows directly from the difference with respect to TBU. The reader may verify for herself that adding NOCONTOUR to the UEN grammar with the same rank as in Oppdal will not have any detrimental effects on the analysis of that variety.

The three grammars are summarized and compared in (5).

(5)

UEN: Top-Ranked, TBU = σ >> MAXLINKL >> *HD_{MAX}/L >> *TONE >> ... (FALL-TO-L*)

NGbr: Top-Ranked, TBU = σ >> MAXLINKL >> *HD_{MAX}/L >> NOCONTOUR >> FALL-TO-L* >> *TONE >> ...

Oppdal: Top-Ranked, TBU = μ >> MAXLINKL >> *HD_{MAX}/L >> *TONE >> ... (FALL-TO-L*)

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