

How to tell H% from L% in right-detached expressions in Norwegian

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ABSTRACT

Native listeners' perception and identification of boundary tone - either low (L%) or high (H%) - in East Norwegian intonation contours is determined by more than just the presence of a falling or a rising tune at the end of the contour. Empirical evidence supports the claim that the H%-L% distinction in syntactically right-detached particles which are lexically specified for boundary tone is accessed most easily if H% is expressed inside and L% outside a focal Foot. This paper accounts for the observed constraints.

INTRODUCTION

We assume, with e.g. Pierrehumbert & Hirschberg (1990), that intonation contours are composed from *pitch accents* (word accents), *phrase accents*, and *boundary tones*. The paradigmatic opposition between a high (H%) and a low (L%) boundary tone in East Norwegian intonation has a more important function with some sentence elements than with others. It is especially important when it is used to differentiate right-detached particles that select H% from those that select L%. Syntactically right-detached ('tag') particles in spoken Norwegian are all attitudinal markers; some of them are realized on an L% slope, others on an H%-slope, while some permit either boundary tone, with a more or less determinate difference in pragmatic meaning between them.

THE EXPRESSION OF BOUNDARY TONES IN EAST NORWEGIAN

East Norwegian intonation is characterized by a syntagmatic contrast between *focal* and *nonfocal* phrase accents, the relevant prosodic phrase being the F(oot) (e.g. Fretheim 1992, Nilsen 1992). Each F starts with an obligatory *prosodic word* manifesting a left-edge word accent, which is L* for Accent 1 and H* for Accent 2, and is optionally followed by one or more unaccented word forms. The F also contains a phrase accent manifested as a right-edge H.

F constituents are grouped together under the IP category (Intonational Phrases) in the prosodic hierarchy. The IP is phonologically more akin to the *intermediate phrase* of Pierrehumbert and Hirschberg, than to their *intonational phrase*. The phrase-accentual H is raised to a higher F0 level at the end of an IP-final F, due to a *focus tone* which is a right-edge IP-level tonal phenomenon and a defining property of the IP.

A rising tune triggered by focus tone is a prerequisite of the expression of a minimal L%-H% distinction at the end of East Norwegian utterances. A postfocal F generated outside the IP category will lack focus tone and will therefore not be a possible vehicle for the generation of H%.

We contend that the East Norwegian system of intonational phrasing is not optimal for the expression of the L%-H% contrast. When the boundary tone of the IU (= Intonational Utterance) is H%, that tone will coincide temporally with the phrase-accentual H if realized inside IP. Our ability to perceive an abrupt decrease in F0 as a falling tune triggered by L% must depend at least partly on the extent of the F0 interval between the earlier maximum and the later minimum, and on the duration of the temporal interval between those maximum and minimum points in the intonation contour. An utterance-final syllable placed outside the IP domain enables a speaker to let the pitch drop from beginning to end in the syllable. On the other hand, an utterance-final syllable

which is F- and IP-internal is realized on a F0 rise toward the target tone *H* before the F0 can start falling to *L%* in the same syllable. Under no circumstances is it possible to shift the F0 maximum from the IU-final syllable to the preceding syllable in order to leave more room for the fall to *L%*. One may ask whether the fall component of the local rise-fall contour of the final syllable can be extended in the temporal dimension to a point where the fall is perceived to be just as prominent as the falling tune on an IP-external particle. How much can the fall at the end of the utterance be stretched out temporally without loss of naturalness? Provided that the fall component of the rise-fall pattern aligned with the IU-final syllable is longer than the rise component, do we perceive the boundary tone as *L%* rather than *H%*?

We suspected that the answers to these questions might differ depending on whether the IU-final syllable is or is not a right-detached pragmatic particle that selects *L%*. Using utterances whose final syllable *da* could conceivably be interpreted either as a pragmatic particle or as a temporal adverb, we set out to test that assumption.

DA - A MULTIFARIOUS NORWEGIAN WORD

Most if not all uses of *da* in present-day Norwegian derive from the pro-adverb meaning 'then', which is used with reference to temporal as well as conditional clauses. As a right-detached particle, *da* has two discernable functions which, although they are related, should be kept lexically apart due to distinct sets of formal lexical properties. *L%-da* is an inference particle, and *H%-da* is a 'polarity reversal' particle (Fretheim 1989): the speaker attributes belief in the expressed proposition to the hearer, and challenges the hearer to reconsider his/her belief. While *L%-da* may be attached either to an interrogative or to a declarative, *H%-da* requires an interrogative 'host'. Also, in South-East Norwegian casual speech, the initial stop segment [d] of the polarity reversal particle may be elided but that of the inference particle may not.

The test sentence chosen was the interrogative *Bodde de der da?* (lit.: lived they there then?). As noted above, interrogatives license both *L%-da* and *H%-da*. Ten speakers of South-East Norwegian dialects were asked to listen to seven different auditory stimuli, each played three times. All seven utterances represented broad-focus intonation patterns with a focally accented time adverbial *der*. *Da* was inside the focal F in two utterances, and F- and IP-external in the remaining five.

Figure 1 is a F0 tracing of a male East Norwegian speaker's utterance of *Bodde de der da?*. The final F0 movement is to the right of the IP constituent and is distinctly falling. In Figure 2, *da* appears inside the focal F, which contains a succession of phonologically significant tones *H* and *L%*, a rise-fall contour produced in the course of the unaccented syllable *da*. (The parenthesis notation indicates the hierarchical IU structure. Vertical bars between tone specifications show F boundaries. The dotted vertical line in Figure 2 marks the beginning of the deliberately prolonged but not unnaturally long syllable *da* in that utterance. Observe also the [L] in the prefocal Accent 2 Foot, whose function is to preserve the so-called Obligatory Principle (OCP), which applies to Norwegian Feet but not across F boundaries.)

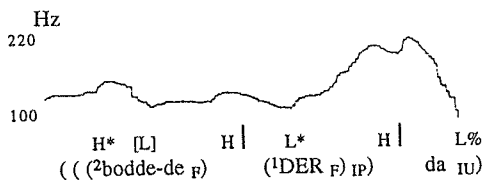


Figure 1

IP-external *L%-da*

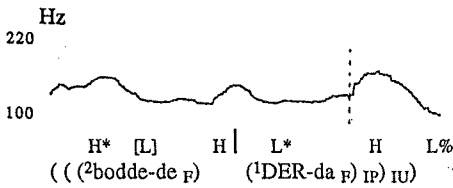


Figure 2

IP-internal L%-da

Figure 3 displays the F0 contour of the other utterance whose tag particle was placed inside the IP domain. This is the situation where the focus tone and the boundary tone coincide at the end of the IU.

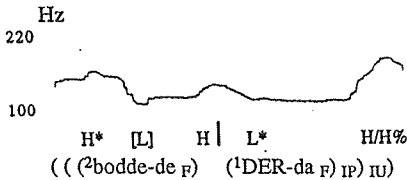


Figure 3

IP-internal H%-da

IDENTIFYING L% AND H%

The task of our ten South-East Norwegian informants was to select one of the three suggested interpretations A-C. They were told to select C only if they felt that neither A nor B was applicable. The stimuli were presented in a random order.

- A - *Er du virkelig sikker på at det var der de bodde?*
('Are you really sure that that was where they were living?')
- B - *Bodde de der, altså?*
(a request for confirmation of the assumption that they lived there)
- C - *Bodde de dér på den tida?*
('Did they live there at that time?')

The particle in the intonation contour of Figure 1 was identified as the inference particle L%-da by nine out of ten informants; only one person associated that utterance with interpretation A, and no one chose the time adverb interpretation. The IU-final F0 fall in Figure 2 on the other hand caused only two informants to identify the particle as L%-da; four chose paraphrase A, which we interpret to mean that they identified da with H%-da in spite of the final fall, and another four found C to be the only possible paraphrase of what they heard when they were faced with the contour of Figure 2. Eight informants identified da in Figure 3 as the polarity reversal marker H%-da, while the remaining two chose the inference interpretation B.

Our informants' reactions to the intonation contour of Figure 2 is remarkable. Acoustically there is just as much of a final falling contour in Figure 2 as in Figure 1. How can we explain that a majority of informants paid attention to the falling tune at the end of Figure 1 but apparently ignored the fall at the end of Figure 2? The intonation structures of Figure 2 and Figure 3 share one feature that distinguishes both from Figure 1, namely the intonational phrasing. The rise to the focal maximum in the IP-final syllable is entirely within the unaccented syllable da. In other words, there is a rise-fall contour

for *da* in Figure 2, as opposed to the straight fall through the right-detached particle in Figure 1. While a rise-fall tune in the IU-final syllable may be good enough for the realization of *L%* in most cases, it seems that the rise component must be eliminated altogether when the fall triggered by *L%* is on a right-detached pragmatic particle which selects *L%* realization. Even if the fall component of the rise-fall at the end of Figure 2 has a longer duration than the preceding rise and also a longer duration than the fall in Figure 1, the rise to the focal maximum appears to outweigh the ensuing fall.

Observe that there is no rule saying that a right-detached particle must be IP-external. *Da* was consistently identified as particle in Figure 3 where it is IP-internal; the favored interpretation of that utterance was A. There was more uncertainty in the informant group when what was intended to be *H%-da* was placed outside IP. The utterance with an IP-external rise showed five votes for A, two for B, and three for C.

To conclude, the right-detached inference particle *L%-da* must be F- and IP-external, because otherwise it would be impossible to produce a particle whose F0 movement is falling from the start. A tag particle that is lexically specified as an *L%* item does not tolerate a rise-fall contour on the particle. This finding supports the Boundary Tone Agreement Condition (BTAC) postulated by Fretheim (forthcoming). He found that when an East Norwegian utterance contains a sequence of right-detached particles, they must be either all *L%* or all *H%*, forming either a falling melody, or a rising melody, through all right-detached items. The result of our perception and comprehension test -- which is going to be followed up by a similar test in which synthetic stimuli will be used -- indicates that even when there is a single monosyllabic right-detached particle at the end of an utterance, the syllable must be perceived as producing a falling tune from beginning to end in order for the particle to be identified as an *L%* item. While the final fall in Figure 2 above may count as an *L%* fall if the word form is understood to represent the clause-internal time adverb, it does not count as *L%* if *da* is supposed to be the right-detached inference particle. Phonologically this is a weird situation. It seems that we are not able to identify the boundary tone in Figure 2 correctly unless we know whether the final lexical item is a pragmatic particle or the time adverb. If it is the latter, then the boundary tone in Figure 2 is *L%*; if it is the former, then the identity of the boundary tone may be indeterminable, due to the fact that the BTAC applies to right-detached particles like the inference marker *L%-da*. Our investigation has shown that the phonological analysis of the intonation structure of Figure 2 may depend on which *da* is being used.

Why did as many as four out of ten informants associate the utterance whose F0 contour is represented in Figure 2 with paraphrase A? One might expect it to be just as difficult to identify the IU-final rise-fall in Figure 2 with *H%* as with *L%*. The intuitions of those four people combined with the large number of votes for an *H%-da* interpretation of Figure 3 suggest that the preferred realization of *H%-da* is an IP-internal realization. Utterances with an *L%* particle are seen to become acoustically maximally different from utterances ending in an *H%* particle when the latter kind of particle is integrated in the prosodic F domain and the former is placed outside F and IP, unaffected by the strong tonal constraints on the form of East Norwegian IPs.

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