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The explananda in North Germanic Tonogenesis

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ABSTRACT: The article discusses two explananda relating to tonogenesis in North Germanic: A) the origin of a tonal representation, B) the origin of a lexical distinction. Tradition has largely focused on B before A. I elucidate the assumptions of the B > A hypothesis and argue that it fails to properly address the phonologization of lexical tones. The alternative hypothesis, A > B, primarily looks to account for the phonologization of lexical tone (i.e., A). The mechanism assumed is the same as is active today: reduction of secondary stress in the word-internal clash context with attendant reanalysis of a postlexical tone as lexical. A prosodic postlexical rule —present in all dialects today— assigns the word tone of accent 2, which subsequently becomes lexicalized in a morpheme by morpheme manner. The developments of a postposed definite article and epenthetic vowels, processes that are always mentioned as instrumental in demonstrating the lexical distinction (B) do not directly bear on tonogenesis as such. The result is that A is the first explanandum.

KEYWORDS: North Germanic; tonogenesis; tonal accents; accent 1; accent 2.

1. Introduction

Research on tonogenesis in North Germanic (NGmc) seeks to reconstruct the origin and diachronic development of tonal phenomena that result in the phonetic, phonological and distributional patterns that we find today in most varieties spoken in the Scandinavian peninsula. For Swedish and Norwegian, the focus is on a tonally manifest contrast between what is (pre-theoretically) called accents 1 and 2, cf. (3). There are distributional correspondences with the laryngeally manifest contrast between stød and no-stød found in varieties of Danish. The general —but not ubiqui-

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tous—[1] assumption is that stød develops later than tone. Therefore, research efforts regarding the origins of the Scandinavian situation have been directed mostly to the tonal facts. This is the focus here, too, where we seek to clarify what property it is that originates in NGmc tonogenesis, i.e., what should be our first explanandum.

Reconstruction proceeds as a string of arguments connecting a hypothesis for the first explanandum with the givens of the present-day situation. Different explananda have been foregrounded in work on NGmc tonogenesis. Often, the conception of the first explanandum is dependent on interpretations and analyses of present-day facts: the variation and geographic spread of tonal types, the functional load in the lexicon and elsewhere, and lexical representation. There are different opinions on how the accents should be analysed today and that affects opinions about their origin.

Two explananda have figured prominently in the discussion of NGmc tonogenesis. I state them below in a manner that allows for variable assumptions regarding representation. One view is that the representation is directly tonal, another that it is metrical. In either case, some structure must be lexical (a lexical tone, a lexical foot).

(1) Explanandum A — The origin of a lexical representation: a lexical tone or other lexical structure of relevance for the realization of the accents.

(2) Explanandum B — The origin of a lexical distinction, tonal or metrical, with relevance for the realization of the accents.

Research tradition seems to have given primacy to explanandum B. The lexical distinction between accents 1 and 2 in the modern languages has received a lot of attention, under a general structuralist back-drop, and so it is natural for researchers to ask where that contrast came from. I will call this line of scholarship *the B > A story*, where the lexical *distinction* is prioritized over the presence of a lexical *representation*.[2]

My own research aligns with *the A > B story*, which looks to explain the lexical representation before dealing with the lexical distinction.

There is a logical order to explananda A and B. A lexical distinction presupposes the lexical representation of some property. Explanandum B therefore presupposes explanandum A, while the reverse does not hold. Nothing prevents lexical tones (or segments) from existing representationally in a language, also in the absence of minimal pairs of the traditional kind. Thus, a lexical tone doesn't necessarily serve a distinctive function in the lexicon. This means that explanandum A is the first explanandum. I will here look at how it is accounted for in the B > A and A > B stories, respectively.

1.1. Simplex pairs of different types

Three types of pairs are indicated in (3), morphological structure is indicated by hyphen, accent is marked by a raised digit, and '•' indicates a position that alternates between vowel and zero.

[1] Liberman (1982), Wetterlin & Lahiri (2015).

[2] This is a simplification since some of the older sources are implicit, overly pre-theoretic, or agnostic regarding the two explananda. I will primarily discuss recent proposals.

(3) Simplex pairs

accent 1	*accent 2*
a. ¹'and-en 'the mallard'	²'and-e-n 'the spirit' (²'and-ar-na 'the spirits')
¹'steg-en 'the steps'	²'steg-e-n 'the ladder' (²'steg-ar-na 'the ladders')
¹'bur-en 'the cage'	²'bur-en 'carried (past participle)'
b. ¹'syrak 'angry (dated slang)'	²'elak 'mean'
¹'ketchup 'id.'	²'senap 'mustard'
¹'regel 'rule' (pl. ¹'reg•l-er)	²'regel 'bolt' (pl. ²'reg•l-ar)
c. ¹'god-is 'candy' (¹'god 'tasty, good')	²'god-ing 'pretty one' (¹'god 'tasty, good')
¹'gris-en 'the pig'	²'gris-ar 'pigs'
¹'läng-re 'longer' (¹'lång 'long')	²'bred-are 'broader' (¹'bred 'wide')

In the descriptive tradition, the tonal contrast is illustrated with surface minimal pairs like those in (3a).[3] At the phonetic level, these phonological strings are identical, distinguished only by the tonal contour (hence 'minimal'). However, the pairs in (3a) correlate with other distinctions in syllabic structure, morphological structure, and/or part of speech, as indicated. Whether the morphological differences are relevant for the tonal distinction is an open question, pre-theoretically. But this issue has to be resolved in order to establish whether we are looking at a *lexical* tonal distinction in (3a), rather than a *dependent* one. The structural facts put the notion of *minimality* in question.

The word pairs in (3b) are not surface minimal, but they are made up of monomorphemic members. This means that the tonal distinction can't be reduced to anything else, in principle, unless we make assumptions regarding structure that is invisible at this point.[4] To emphasize the point, parts of speech and meanings have been matched. *Syrak* and *elak* refer of states of mind (albeit with a stylistic difference), *ketchup* and *senap* are both suitable condiments on hot dogs, and both are borrowings. These pairs isolate the tonal contrast as necessarily lexical. The last pair in (3b) is minimal-looking —*regel* vs. *regel*— and both nouns exhibit the alternation between vowel and '•' in the paradigm. But different declensions are involved.

A third set of pairs, in (3c), localizes the source for the tonal contrast to suffixes. Here the addition of suffixes correlates with accent variation. With *god-is* and *god-ing* we have two derivational suffixes, both nominalizing. With *gris-en* and *gris-ar* we have two inflectional suffixes, expressing definite singular and indefinite plural. Unless there is a structural distinction here that we can't see, the tonal contrast must be due to a *lexical* difference between *suffixes*.[5] In the dimensional adjectives *läng-re* and *bred-are*, the accent variation correlates with two different comparative endings, one accent neutral, the other accent 2-inducing.[6]

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[3] Monosyllables and oxytones invariably exhibit accent 1, see (4a).

[4] This caveat anticipates a discussion of analyses that do indeed assume structure that is not visible right now.

[5] These patterns are stable across the comparable vocabulary. All monosyllabic noun roots that take *-ar* as their plural ending get accent 2. All monosyllabic nouns retain accent 1 in the definite form, etc.

[6] *Längre* 'longer' contains an umlauted vowel, which may or may not be a factor here. Most forms that take the *-re* comparative exhibit umlaut (*stor* 'big', *större* 'bigger'; *få* 'few', *färre* 'fewer').

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We conclude that there is indeed a lexical tonal distinction which is reflected as accents 1 and 2 in surface forms. However, the crucial evidence for the *lexical status* of the distinction is not the typical minimal pairs cited in (3a), but the semantically and morphologically controlled pairs given in (3b) and (3c).

In view of this, it is surprising that minimal pairs have played such a central role in the research on NGmc tone accent. Pairs of the (3a) type can certainly illustrate the phonetic contrast, but they do not serve as good evidence for a lexical distinction involving tones.

It is also surprising that the lexical distinction between simplex forms maintains a lurking presence in accounts for the origin of accent. When the gaze is turned from the synchronic state to the origin, one runs the risk of projecting what appears to be important in the modern languages onto the diachronic development. But there is a potential fallacy here. By defining minimal pairs as the core context today, researchers may look also for explanations for tonogenesis in simplex forms at the historical time of tonogenesis.

1.2. Postlexical accents

There are *postlexical* contexts for the accents, too, when accent assignment is due to prosodic rather than lexical or grammatical conditioning. Postlexical contexts are given in (4), with simplex vs. compound in (4a-b), and derivations in (4c-d). Prosodic word boundaries are marked with parentheses (indexed with 'ω' for 'prosodic word', minimal and maximal). In the complex forms, minimal prosodic words are contained in maximal prosodic words. Accent is determined at the level of the maximal prosodic word (Myrberg & Riad 2015).

(4) Postlexical accent

accent 1	*accent 2*
a. $^{1}((\text{ˈand})_{\omega})_{\omega}$ 'the mallard'	b. $^{2}((\text{ˈand})_{\omega}\ (\text{ˌjakt})_{\omega})_{\omega}$ 'mallard hunt'
$^{1}((\text{kataˈlog})_{\omega})_{\omega}$ 'catalogue'[7]	$^{2}((\text{ˈjakt})_{\omega}\ (\text{ˌlag})_{\omega})_{\omega}$ 'hunting team'
c. $^{1}(\text{för-}(\text{ˈtala})_{\omega})_{\omega}$ 'to slander'	d. $^{2}((\text{ˈvän})_{\omega}\ (\text{-ˌskap})_{\omega})_{\omega}$ 'friendship'
$^{1}(\text{be-}(\text{ˈfara})_{\omega})_{\omega}$ 'to fear'	$^{2}((\text{ˈform})_{\omega}(\text{-ˌbar})_{\omega})_{\omega}$ 'mouldable'
$^{1}(\text{be-}(\text{ˈhålla})_{\omega})_{\omega}$ 'to keep'	$^{2}((\text{ˈo-})_{\omega}(\text{ˌklok})_{\omega})_{\omega}$ 'unwise'

Accent 1 is here taken to be the default accent in simplex forms, hence always postlexically assigned. Accent 1 shows up in monosyllables and oxytones in (4a), and also in some disyllables, cf. (3b). More interesting for the prosodic assignment of accent are the cases in (4b-d). These are all prosodically complex structures, where the minimal and maximal prosodic words are distinguishable. There is derivation by compounding in (4b), derivation by prosodic adjunction in (4c), and derivation by stressed suffix or prefix in (4d).[8]

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[7] A compound where the first element has initial unstressed syllables (e.g., *kataˈlogˌpris* 'catalogue price') will tend to get accent 1 in dialects that admit both accents in compounds. Initial unstressed syllables demonstrably favour accent 1 also in other morphologically complex contexts (Riad 2012, 2014, 2015).

[8] We leave several prosodic conditions that affect the realization of lexical accent aside here (Riad 2014, 2015).

In complex forms, prosodic information tends to determine the accent. In (4c), where the simple forms *tala* 'speak', *fara* 'fear', and *hålla* 'hold' would get lexical accent 2, the adjoined structure triggers accent 1. For compounds, there is some variation between dialects. The prosodic influence is the strongest in dialects where accent 2 is doubly associated in compounds, i.e., to the north and to the east (see map in Riad 2018: 355). In the western and southern varieties, lexical and grammatical information of relevance for tone interacts with prosodic factors in compounds (Bruce 1974; Kristoffersen 1992; Riad 2015). Once you control for the lexical influence, the regularity for accent assignment in prosodically complex forms turns out to be quite simple: If there is one stress, postlexical accent 1 is assigned (4a) and (4c), if there is more than one stress, postlexical accent 2 is strongly favoured (4b) and (4d).

1.3. Tonogenesis

The origin of lexical tone in NGmc is radically different from the famous cases of Southeast Asian or Athabaskan tonogenesis where a segmental contrast (voicing, aspiration) is reanalyzed as a tonal one (Svantesson 1989; Kingston 2011). There is consensus that it is intonation that leads to the emergence of a lexical tonal element in NGmc.

Below we outline the general arguments for two families of proposals, often referred to as the Old Scandinavian hypothesis (ca 1000-1200 AD) and the Proto-Nordic hypothesis (ca 800-850 AD). They refer to two different time periods, but they also address explananda A and B in different ways. The Old Scandinavian hypothesis takes explanandum B as starting point, and rather downplays explanandum A (hence B > A), whereas the Proto-Nordic hypothesis has explanandum A as the main target and explanandum B as a consequence (hence A > B).

For each proposal, I indicate what is said for the phonetic and phonological precursors, and for phonologization. The precursors specify the state from which the lexical facts emerge (*pre hoc*). Phonologization is the crucial process by which a property becomes lexical, leading into the *post hoc*.

2. The B > A story

In accounts for explanandum B —the origin of the accent distinction— two historical changes are noted as crucial: cliticization of the definite article, and epenthesis before sonorants (Oftedal 1952; Gårding 1977; Riad 1998a; Bye 2004, forthc.; Perridon 2006; Hognestad 2012; Iosad 2016). By these changes, new classes of surface disyllables come into being. The new disyllables exhibit accent 1, in contrast with older disyllables which exhibit accent 2.

(5) Sources for new disyllables
  a. Cliticization of the postposed definite article
    and hinn > and-en 'the mallard'
  b. Epenthesis in words ending in a syllabic sonorant
    segl > segel 'sail'

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The changes take place in the period 1000-1200 AD. Both are implemented over a period of time.[9] For our purposes it will suffice to assume the handy year 1000 AD as a terminus ante quem for the establishment of the lexical contrast.

2.1. Phonetic and phonological precursors

The modern B > A proposals aim at explaining how the contrast comes about in simplex forms. The phonetic underpinnings of the development are taken to be based on word length (monosyllables vs. disyllables). The basic idea is quite simple. In the period preceding the emergence of a lexical contrast, regular intonation was differently realized in monosyllables and polysyllables, where the timing of one and the same intonational contour would vary as a function of word length. Some scholars have connected this variation with the earlier process of syncope, while others appeal to the phonetic phenomenon of peak delay known from other languages. The variable realization of an intonation contour in domains of different size has been assumed at least since Öhman (1967; see also Oftedal 1952; Elstad 1980; Lorentz 2002; Bye 2004, forthc.; Perridon 2006). The assumed situation is sketched in (6) in terms of peak delay (after Bye 2004: 10).

(6) Allophonic timing by number of syllables

a. no peak delay b. peak delay

Assuming a basic LHL contour, the H peak will occur earlier in monosyllables than in disyllables, given the difference in available space. These are allophonic precursors to the distinctive accents 1 and 2.

In the next step, cliticization of the definite article and epenthesis before word-final sonorants take place, cf. (5). The new classes of disyllables emerge *without* triggering peak delay, instantiating a different prosodic contour from the previous disyllables, which retain peak delay (Bye forthc.: 5). At this point, a lexical contrast is manifest among disyllables, since some property (a lexical tone, relevant foot structure) has become phonologized.

2.2. Phonologization

How does phonologization happen? B > A approaches typically do not elaborate on this step. Elstad suggests that "[b]y and by the «normal» pitch patterns in strongly stressed position (especially at the end of intonation groups) were transferred to the word itself and became an inherent feature of it when the demonstrative pronoun was agglutinated to the noun and passed into a definite article." (Elstad 1980: 392). Perridon cites the very introduction of the new classes of polysyllables as the source: "This led eventually to […] the phonemicization of the allophonic variation" (Perri-

[9] See Stroh-Wollin (2016) for a recent discussion of the tricky issues surrounding the development of the definite article.

don 2006: 106). Iosad elaborates on tonal stability as a central mechanism for tonogenesis, but fails to address phonologization: "At some point, the difference between earlier and later placement of the peak enters the phonological grammar. Crucially, changes in the conditioning environment do not lead to changes in tonal associations" (Iosad 2016: 84).

Peak delay is the *pre hoc* stage. The lexical contrast is the *post hoc* stage. In these proposals, the allophonic situation should result in a lexical specification of some kind, which produces the surface melodic contrast. But that issue is not addressed. Without an account for *how* the actual change in lexical representation happens, we can't assess the relevance of the *before* to the *after*. It is the coming-into-existence of the lexical property (which is absent in the *pre hoc* stage) that should be explained.

Tonal stability, prominent in Iosad (2016), also requires some representational content, either lexical or postlexical (rule-based). Otherwise, appeal to tonal stability as part of the explanation is circular, peak delay being a tonal *in*stability, by definition.

Bye (forthc.) maintains that the tonal distinction is due to differences in metrical structure (Morén-Duolljá 2013; Köhnlein 2016). The new disyllables (those that get accent 1) have a different prosodic word structure from the old disyllables, as the enclitic definite article attaches differently to the stem than do other suffixes. This is illustrated below, based on Bye (forthc.), where the symbol 'ω' represents 'prosodic word', and 'φ' represents 'prosodic foot'.

(7) Different metrical structures

a.	b.	c.	d.
(bu:)$_{ω}$	(bu:it)$_{ω}$	((bu:)$_{ω}$ it)$_{ω}$	((fu)$_{φ}$ gəl)$_{ω}$
'dwelling'	'(has) inhabited'	'the dwelling'	'bird'

These representations illustrate the prosodic-metrical structures that affect tonal alignment. The first forms here represent the structures that induce no delay in monosyllables (7a) and peak delay in disyllables (7b) in their tonal alignments, cf. (6). The form in (7c) represents the metrical structure of the definite form after suffixation, a recursive prosodic word (cf. Ito & Mester 2009). In this analysis, the tonal differences between old and new disyllables caused by suffixation can be captured by reference to the minimal prosodic word as the alignment domain for tone. At this stage, the analysis does not presuppose the phonologization of a lexical property, since everything is synchronically predictable, given the assumptions.

As Bye himself notes, this analysis will not work for the second context in (5), i.e., epenthesis. For those contexts the proposal is that "epenthesis triggers reanalysis of the mainstress foot as A[lignment] D[omain]" (Bye forthc.: 5). This step is illustrated in (7d) and indeed represents a case of phonologization since some lexical information comes into being. The lexical foot structure entails an unpredictable context for accent 1 given standard foot structure.[10] However, the actual process of phonologization is not elaborated.

[10] This structure is required also for members of distinctive pairs like those in (3b).

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Goldshtein (2020) provides an analysis in the same spirit but suggests the streamlined prosodic structure for feet and prosodic words seen in (7d) from the outset for the accent 1 disyllables:

> In the new disyllables, which arise from cliticization and epenthesis, the unstressed second syllable does not have the same place in the prosodic structure. It could be considered as outside of the foot, ($_{\omega}$ ($_{\varphi}$ σ) σ), and thereby outside of the stress domain. The consequence is that the H* tone of the stressed syllable can flow to the right in the original disyllables, but not in the new disyllables. (Goldshtein 2020: 155; my translation)

Thus, this proposal, too, stops short of an account for the phonologization.

2.3. Discussion

The B > A story is strongly concerned with getting the minimal pairs in place (old disyllables vs. new disyllables). Hence, there is a focus on explanandum B. Explanandum A is given shorter shrift and the mechanics of phonologization are not discussed. The types of arguments that are called upon in the B > A story are rather circumstantial than imperative. While peak delay is phonetically normal and tonal stability is well-known, we do not get an answer to the question why peak delay should be active at point x in time, and cease to be active at point y, in some variety z of North Germanic. Without a worked-out argument connecting the phonetic precursors with the later lexical distinction, i.e., an argument for how phonologization happens, these proposals remain scenarios for a diachronic development rather than real hypotheses for the origin of lexical tone (or of other lexical structure affecting tone).

The models cited in this section tend to rely on metrical structure as relevant for the tonally realized distinction, where non-distinctive intonation is taken to align with metrical structure. In the relevant instances, some metrical structure becomes lexical, causing surface contrasts in tonal alignment. An account for phonologization should therefore address how the relevant metrical structure goes from being postlexically assigned to being represented in the lexicon.

3. The A > B story

The A > B story looks to explain how precisely some part of intonational structure becomes lexical or lexically controlled (explanandum A), before looking at the distinction as such between accents 1 and 2 in the languages (explanandum B). The A > B order removes the bonds cast by the lexical distinction in simplex forms from the search for answers bearing on tonogenesis. Instead, phonological representation comes to the fore.

The change from a phonetic precursor to a lexical structure plays out in representation. It becomes appropriate to consider generalizations like (8).

(8) Minimal domain for accent 2
The regular realization of accent 2 requires minimally a disyllabic domain (counting from the primary stress).

The generalization in (8) holds for all dialects. This size requirement for the realization of accent 2 is in dynamic evidence when compromised by apocope, as happens in some dialects. Apocope leads to a tonal crowding effect known as circumflex

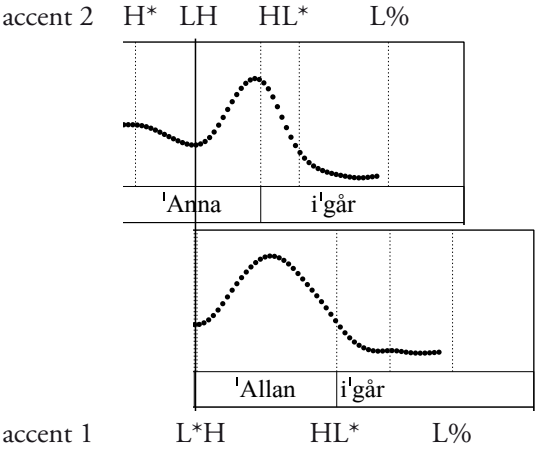
accent, where several tones are fitted into a single syllable (Lorentz 2008: 51). The size requirement does not hold for accent 1.

The simplest account for (8) is that accent 2 should contain one more tone than accent 1 in the phonological representation, and that the total number of tones in accent 2 thereby exceeds what can be comfortably hosted in a single syllable. By this hypothesis (if validated by phonetic and phonological arguments), the contrast between the two accents is representationally privative. Assuming a tonal analysis of the distinction, the extra tone of accent 2 would then be the actual *lexical* property in the pairs in (3). The rest of accent 2 and all of accent 1 is made up of (the same) intonational tones. This is the closest we get to a minimal hypothesis for representation.[11] We refer to the extra tone of lexical and postlexical accent 2 as the 'word tone'.

Explanandum A can now be stated as 'a lexical tone' (alternatively 'a word tone'). That is what originates in the type of words that (today) contain more tones (accent 2) than the other type of words (accent 1). An account for tonogenesis can proceed from here and falsification can be mounted by looking at the manifest expressions in the phonetics and phonology of tone.

This statement of explanandum A makes the simple prediction that the accent 1 contour should be a subset of the accent 2 contour, everything else being equal. This is easy to demonstrate, particularly for the dialects of the double-peak type (Riad 2018). Two contexts from Central Swedish (CSw) will make the point. (9) illustrates the similarity of contours in simplex forms, once you separate out the extra, initial tone in accent 2 (H* in CSw, Bruce 1977; Riad 1998b, 2018). The tonal structure to the right of the vertical line is identical between the accents.[12]

(9) Accent 1 is a subset of accent 2



[11] Privativity is the normal case also for e.g., Cologne Franconian (Gussenhoven & Peters 2004) and Goizueta Basque (Hualde *et al.* 2008). Note that privativity in the representation does not as such entail that the extra tone in accent 2 should be either lexical or postlexical. The issue of what exactly it is that is distinctive remains separate.

[12] The accents have been put in the carrier sentence *Hon ringde* [name] *igår* 'She called [name] yesterday'. The big accent on the name (H*LH or L*H as the case may be) is followed by a small accent 1 (HL*) on *igår*, and the boundary L% tone comes after that (Myrberg & Riad 2015).

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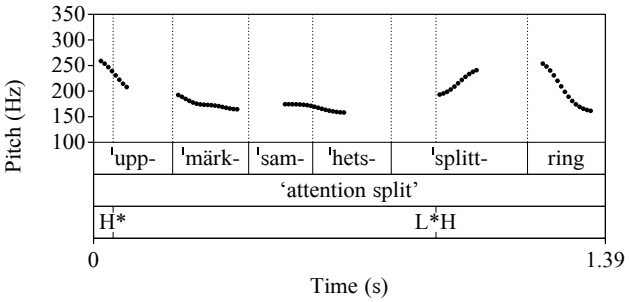
The representational facts single out accent 2 as the representationally marked member of the contrast.

The other context concerns postlexical accent 2 in compounds and other structures containing more than one stress, cf. (4b) and (4d). CSw compounds regularly get postlexical accent 2. The postlexical H* word tone associates with the first stressed syllable and the pitch accent (or prominence tone) L*H associates with the last stressed syllable in the compound (with L spreading backwards, Riad 1998b, 2018; see also Gussenhoven & Bruce 1999). This structure is very clear in long compounds, cf. (10).

(10) Long compound, accent 2, CSw



The initial H* word tone is clearly separated from the rest. The rise on the last stressed syllable is identical to the accent 1 simplex contour (L*H). Indeed, if we cut out |*splittring*| from *uppmärksamhetssplittring* ‘attention split’ and listen to it, the contour sounds just like accent 1, whereas the free simplex form ²ˈ*splittring* ‘split’ should have accent 2. This makes the contrast very clear and illustrates the fact that accent 1 is tonally contained within accent 2. Note that the pattern in (10) is not due to the morphological process of compounding as such, but to the *prosodic* context of two (or more) stresses in a form, cf. (4b) and (4d). Looking ahead, the argument for tonogenesis will be that a particular context for postlexical accent 2 predates lexical accent 2.

3.1. Phonetic and phonological precursors

The lexical/postlexical word tone in tonal varieties of NGmc invariably associates with the primary stressed syllable and thereby displaces the pitch accent to the right. In accent 1, there is no lexical tone and the pitch accent can associate to the stressed syllable (L*H in CSw). In Germanic languages, it is so normal for tones to show up on stressed syllables that one easily forgets to mention the connection between the lexical property to be explained and the place where it shows up. The phonetic precursor of the lexical tone, then, is really easy to locate on this story: it is an intonational prominence on the main stress syllable. The tone would more likely include a H tone (H, HL, LH) than not (L).

Another part of the phonetic background is stress clash and the regular resolution of it (Nespor & Vogel 1989). Under the uniformitarian hypothesis, there would be synchronic resolution of stress clash in late Proto-Nordic just as there is today, and,

with minimal assumptions, in the same way. In Germanic languages, clash resolution reduces the lefthand stress in phrases, and the righthand stress in morphologically complex words like compounds. The latter is relevant here. Swedish and Norwegian resolve word internal stress clash under a persistent tonal configuration, unlike the other Germanic languages. We hypothesize that this is the phonetic underpinning of tonogenesis (Riad 1998a).

As mentioned, accent 2 is general in *any* word structure that contains two stresses or more in CSw, cf. (4) and (10) above. That is a broader generalization than what we find in several other tonal dialects. The core generalization, which holds for all tonal dialects, is that accent 2 obtains in canonical stress clash, where 'canonical' means that the primary stressed syllable is word initial. When no lexical generalization interferes, the result is postlexical accent 2, in all modern dialects. It arises in two morphological contexts in the modern languages: compounds and derivations with a stressed suffix. Examples of compounds are given in (11).

(11) Canonical clash in compounds
CSw ²ˈvårˌdag 'spring day', ²ˈbokˌbord 'book table', ²ˈhemˌtam 'domesticated'
ENw ²ˈvårˌflom 'spring flood', ²ˈbokˌorm 'book worm', ²ˈhjemˌsted 'home'
SSw ²ˈblodˌprins 'blood prince', ²ˈvaxˌlök 'wax onion', ²ˈmjölkˌhambo 'milk hambo (dance)'

To make the argument clear we include data from three dialects: Central Swedish (CSw), East Norwegian (ENw) and South Swedish (SSw). The two latter varieties admit both accents in compounds, i.e., they do not have the general version of the postlexical accent 2 rule found in CSw.[13] In ENw and SSw, the assignment of accent in a compound is determined by several interacting factors, relating to 1) lexical information like accent in the first member or the linking element (if any), 2) grammatical information like part of speech, and 3) prosodic factors like initial or noninitial stress in the first compound member, and the presence of stress clash (Riad 2015: chapter 13).

The cases cited in (11) are all instances where stress clash determines accent. The members of the compounds are monosyllabic or contain a second member that has accent 1 in isolation (*hambo*), so accent 2 can't be lexically caused by either compound member. Instead, accent 2 results from the prosodic constellation of stresses (again, in the absence of competing factors). The ENw data consist of extant compounds, while the SSw data are made-up compounds, drawn from Bruce (1974). Bruce used compounds like these to find out what factors affect accent assignment in SSw, and stress clash was one. Importantly, the data in (11) tell us that there is a prosodic context which induces postlexical accent 2 in all tonal dialects. This fact provides the beginning of an argument that stress clash is relevant to tonogenesis.

However, compounds are far too infrequent to be a likely morphological locus for tonogenesis. Morphological derivations with a stressed suffix take us closer to the original context (but still not all the way), cf. (12).

[13] Variable accent is admitted when the tonal structure is the same in compounds as in simplex forms (Riad 2018: 359ff.).

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(12) Clash in derivations[14]
CSw ²ˈsjukˌdom ‘sickness’, ²ˈstridˌbar ‘fit for fight; argumentative’, ²ˈvänˌskap ‘friendship’, ²ˈbarnˌlös ‘childless’, ²ˈverkˌsam ‘active’
ENw ²ˈbarnˌdom ‘childhood’, ²ˈbærˌbar ‘portable’, ²ˈbrorˌskap ‘brotherhood’, ²ˈrådˌløs ‘at a loss’, ²ˈlangˌsom ‘slow’
SSw ²ˈungˌdom ‘youth’, ²ˈspelˌbar ‘playable’, ²ˈherrˌskap ‘gentlefolk’, ²ˈgagnˌlös ‘pointless’

The pattern here, for *all* dialects, is postlexical accent 2 when there is a clash. The connection between the morphemes involved is closer in derivations than in compounds. This distribution indicates that stress clash in a close morphological construction is a stable source for postlexical accent 2. The closest morphological construction is found in inflections, which we return to after illustrating how stress clash is resolved synchronically.

In order to account for the diachronic phonologization of tonal information, we need a hypothesis for the tonal structure also on the secondary stress. The simplest assumption mimics the one we made for primary stress, i.e., a peak. The contour on the secondary stress should include a H tone (as in contemporary Central, West or North Swedish). (13) illustrates how stress clash resolution works in CSw today.

(13) Synchronic stress clash resolution

a.	∧ ∧		∧ ∧	
	x x		x .	
	ˈsjuk-ˌdom	>	ˈsjuk-ˌdom	‘sickness’
	ˈhem-ˌlös	>	ˈhem-ˌlös	‘homeless’
b.	∧ ∧			
	x . x			
	ˈrike-ˌdom			‘richness’
	ˈorkes-ˌlös			‘feeble’

In (13a), secondary stress is reduced without a change in the intonational contour. In (13b), there is no clash and secondary stress is retained. The suffix -ˌ*dom* has a short vowel, while -ˌ*lös* has a long vowel.[15]

We will now assume that things were exactly the same way in late Proto-Nordic. Primary stress and secondary stress were tonally marked with a tonal peak. We assume the double-peak melody because it is the simplest hypothesis (rather than because the analysis would require it). The double-peak contour is also the dominating tonal pattern in the area that exhibits the broadest evidence for accent 2 in compounds today (see Riad 2006).[16]

In late Proto-Nordic there were stressed suffixes also in the *inflectional* system. Many of the inflections were constituted by heavy syllables. Such syllables contained

[14] There is a stressed derivational ending -ˌ*het*, which exhibits accent 1 in ENw and SSw in forms like ¹ˈ*enˌhet* ‘unity’, ¹ˈ*godˌhet* ‘goodness’. This suffix enters the language relatively late (mid 1300’s), by borrowing from Low German, so we leave it to the side here.

[15] The status of -ˌ*dom* as a derivational suffix is undisputed, while -ˌ*lös* still carries some connection to the adjective *lös* ‘loose’, although the meaning of the suffix -ˌ*lös* is ‘without’.

[16] For the purposes of the argument pursued here, any dialect will work as starting point, as they all exhibit accent 2 in the stressed derivations.

a foot and were prominent under the quantitative system of the time (moraic trochees, Riad 1992). Inflectional suffixes would show up in a clash with primary stress much more frequently than any other morphological category. Inflections, then, should be the first morphemes to phonologize a tone as lexical.

There are crisp boundaries around the set of forms that develop lexical accent 2: Forms that contained another stress beyond the primary stress in Proto-Nordic correspond to the forms that have accent 2 today (Riad 1988: 22f., 1998a; d'Alquen & Brown 1992: 61f.). In case the secondary stress has been lost, *lexical* accent 2 obtains. In case the secondary stress persists, *postlexical* accent 2 obtains. New forms of both kinds have come into the language in the meantime. All stresses in the inflectional system have been lost, cf. (15), whereas in the derivational system, some stresses remain, cf. (12), while others have been lost (*-lig, -are*). Yet others are in the process of losing stress (*-sam*). The relevant correspondence for accent 2, then, is not the number of syllables, but the presence of a secondary stress in the period preceding phonologization, which we now turn to.

3.2. Phonologization

The A > B story holds that an intonational tone on the primary stress syllable becomes reanalyzed as a lexical tone, as a canonical stress clash gets resolved permanently (i.e., diachronically). The typical, original context for phonologization of a lexical tone is a previously stressed inflectional suffix. The source is a postlexical contour, which is today clearly identifiable as accent 2. Thus, we assume that postlexical accent 2 was around in the period preceding phonologization, just as it is today. This assumption abides better with Ockham's razor than the alternative, i.e., where the rule is taken to come into being at some later point in time.

The type of diachronic change is *reanalysis*. The structure with reduced stress in the suffix and postlexical accent 2 (older generation) is reanalysed as a structure without stress in the suffix but with lexical accent 2, assigned by the suffix (new generation). The change takes place covertly, under clash resolution, suffix by suffix (Riad 1998a). The process is illustrated in (14), where tonal structure is marked as in CSw. Metrical structure is indicated as a simple grid below the forms. Syncope, reanalysis and reduction are diachronic changes, while clash resolution is synchronic.

(14) Diachronic loss of stress

a. H* L*H H* L*H H* L*H *H**LH

ˈdōmi-ˌjan > ˈdǿm-ˌan > ˈdǿm-ˌan > ˈdǿ̄m-a$_H$ 'deem, judge'

x . x x x x . x .

syncope *clash resolution* *reanalysis*

b. H* L*H H* L*H

(-ˌdōm >) ˈsjuk-ˌdom > ˈsjuk-ˌdom 'sickness'

x x x .

reduction *clash resolution*

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c. *H** LH
|
(-ˌlīk > -ˌlik >) ˈljuv-lig$_H$ ‘lovely’
x .
reanalysis

(14a) illustrates the development of an infinitive form. After syncope, this form contains a clash which is resolved synchronically. The resolved structure gets reanalysed as non-clashing, i.e., with an unstressed but accent-inducing suffix. Loss of stress means loss of tonal association, too. Postlexical accent is marked as ‘H*’ and lexical accent is italicized ‘*H**’. (14b) illustrates stress clash resolution under postlexical accent 2 that holds in all dialects. The suffix -ˌ*dom* remains stressed to this day, though the vowel has shortened. (14c) illustrates the situation for the suffix *-lig* which is unstressed in the modern dialects. The earlier form with a long vowel is indicated in parenthesis. It has undergone reanalysis, whereby stress has been lost and a lexical tone acquired.

Almost all inflections that are syllabic in the present-day NGmc languages correspond to stressed syllables in late Proto-Nordic. And they are unstressed and uniformly induce accent 2 in all tonal dialects today. A few examples from Swedish are given in (15), where the lexical tonal property is marked as an index ‘$_H$’, indicating the lexical tone that is assigned to the stressed syllable.

(15) Accent 2-inducing inflections

desinential	-e$_H$, -a$_H$	^{2}ˈand-e ‘spirit’, ^{2}ˈtran-a ‘crane’
plural	-ar$_H$, -or$_H$, -er$_H$	^{2}ˈknekt-ar ‘knights’, ^{2}ˈtran-or ‘cranes’, ^{2}ˈdikt-er ‘poems’
infinitive	-a$_H$	^{2}ˈtvätt-a ‘to wash’
present tense	-ar$_H$	^{2}ˈgast-ar ‘howls’
preterite	-de$_H$	^{2}ˈvän-de ‘turned’
comparative	-are$_H$	^{2}ˈglad-are ‘happier’
superlative	-ast$_H$	^{2}ˈsnäll-ast ‘kindest’

The inflections provide a static correlation between former stress and present-day lexical accent 2. As one might expect, some derivational suffixes vary in stress status between dialects. The suffixes *-ning, -ling, -ad, -an* remain stressed in Älvdalska as described in the early 20th century (Levander 1909), but are unstressed in standard varieties of Swedish and Norwegian (Riad 1998a: 83f.). The issue remains to be explored in more dialects. This situation points at a predictable dynamic argument: We should find derivational suffixes which are in the process of reanalysis. An example from CSw is -ˌ*sam*, which is stressed in most contexts (ˈ*hälsoˌsam* ‘healthy’, ˈ*smittˌsam* ‘contagious’), but unstressed in the most frequent words in canonical situations (ˈ*långsam* ‘slow’, ˈ*ensam* ‘lonely’, cf. Riad 2014: 249, 2015).

3.3. Discussion

Under the A > B story, accent 2 emerges as containing explanandum A (a lexical tone). The lexical tone develops from a postlexical tone, by reanalysis in the context of stress clash resolution. The very same process proceeds covertly today in the

very same way, and in the very same prosodic circumstances as assumed for late Proto-Nordic. In this regard, the A > B argument makes minimal assumptions (Riad 1998a: 75ff.).

Under the B > A story, by contrast, explanandum A should be found in accent 1 disyllables (a lexical foot). The B > A story thus points at accent 1 as the marked structure (a stance that fails to account for the size restriction for accent 2, cf. (8)). This entails some abstractness since accent 2 is tonally richer than accent 1.

With A > B the focus is on postlexical accent 2 as the source for lexical accent 2. Cliticization and epenthesis thereby have no organic role in the A > B story. In the B > A story, the two processes are sometimes said to play a part in driving forth lexical accent. However, accounts for just how this would happen are lacking at present.

What about explanandum B, the origin of the accent distinction? Under the A > B story, the pairs found in (3) are all epiphenomenal. A number of forms arise as the result of the diachronic loss of stress in an originally postlexical accent pattern, where the tonal contour remains stable. The changes that lead to contrasting *pairs* are not organically related to tone. The definite article attaches to roots with either accent without causing any change (*and-en/ande-n*). Epenthesis takes place without changing accent. So both processes are accent neutral and neither should therefore be expected to add anything to the understanding of tonogenesis.[17]

As always, a given hypothesis raises new questions. For instance, where does the rule that assigns the postlexical word tone come from? Some researchers have been concerned with it (Kock 1901; Oftedal 1952; Perridon 2006; Riad 1998a). This is where the earlier process of syncope may come into the picture, with potential differences in how it plays out in the various Germanic languages, whether it affects the second or the third syllable first, and so on. We will not address this question here, simply because it is another question.

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[17] A plausible mechanism for the phonologization of a tonal phenomenon that crucially depends on these two unrelated and non-tonal changes has yet to be presented.

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