

From quantity to syllable cuts: On so-called lengthening in the Germanic languages

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This paper shows how a phonological theory integrating a concept of syllable cuts not only accommodates the well-known structural asymmetries associated with tense and lax vowels but also permits an intuitively plausible account of certain phonological changes which appear to run counter to basic tenets of theories analysing those changes in terms of quantity, chief among them the so-called lengthening before certain clusters implying a mora increase in closed syllables, contrary to well-established principles of syllable weight for quantity languages.

After an introduction of the relevant prosodic concepts of quantity and syllable cuts (sec. 1), and a description of the phonetic concomitants of the syllable cuts (sec. 2), the phonological asymmetries in syllable structure and word accentuation associated with the syllable cut prosody are discussed, and a notational framework is presented for the representation of the prosodies (sec. 3). It is demonstrated how the framework accommodates well-known theoretical constants and methodological "test" cases such as the contrast between short and long segments (including affricates and diphthongs), syllable weight in quantity and syllable cut languages, and prosodic stability under segmental change (sec. 4).

Next it is shown how this prosodic framework provides phonological representations of related words in the older quantitating Germanic languages and in the contemporary non-quantitating ones, such as MHG [bo:nə] > NHG [bo:nə] (where the *phonological* representation changes) and MHG [namə] > NHG [namə] (where it does not), and how the so-called lengthening before *r*-clusters and the seeming preservation of shortness before *t* in Contemporary German is expressed without recourse to quantity, e.g. in NHG *wird* 'becomes', [virt] > [virt], and in MHG *gate* [gatə] 'husband' > NHG *Gatte* [gatə] (sec. 5).

In the subsequent sections (6 and 7), the so-called lengthenings, e.g. in OE *findan* [findan] > ME *finden* [fi:ndən] (NE *find* [faɪnd]), and shortenings, e.g. in *fifty* alongside *five*, before certain (distinct) sets of consonant clusters in the history of English are discussed and interpreted as evidence for a transition from a quantitating to a syllable-cutting language. A discussion of the so-called Middle English Open Syllable Lengthening follows; this change is interpreted as the final step in the transition from quantitating Old English to syllable-cutting Late Middle English, viz. the association of phonetic length with phonological smooth cut under accent, open syllables preferentially tending to preserve the sub-phonemic smooth cut when phonological quantity is lost (sec. 8). Similar changes are pointed out for other Germanic languages, especially Icelandic (sec. 9). A summary of the major results of the study concludes the paper.

1. Introduction and definitions

The older Germanic languages were quantity languages in the classical phonological sense, i.e., their phonological systems were characterized by an opposition of light and heavy syllables based on vowel quantity (i.e., an opposition of long and short vowels) and consonant quantity (an opposition of geminates and single consonants) by the following definition:

- (1) A full (i.e. non-reduced) syllable is LIGHT if it is an open syllable with a short nucleus, else HEAVY.

None of the surviving Germanic languages are quantity languages in this sense. In particular this is true of English, German, and Icelandic. As a matter of fact, these three languages have transformed the old opposition of long and short vowels into one of tense and lax vowels, of which the tense vowels are still phonetically longer than the lax ones in standard varieties of English and in Standard German, whereas in Icelandic concomitant length of this sort has totally disappeared, and a new length contrast has developed on phonotactic grounds and is presently being phonologized under morphological pressure.

In a series of papers on Standard German prosody (Vennemann 1990, 1991a, b, 1994) I have shown that the relevant opposition there is not one of quantity in the classical sense but rather one of syllable cuts. In this theory, whose beginnings date back to Eduard Sievers in the 19th century (cf. Sievers 1901) and which has been supported by such eminent phoneticians and phonologists as Otto Jespersen (1926) and Nicolai Trubetzkoy (1939), two ways of shaping a full syllable are distinguished:

- (2.a) ABRUPT CUT, defined by an energy contour with a sharp drop at the very end of the syllable nucleus
- (2.b) SMOOTH CUT, defined by a slow drop of the energy contour extending over a large portion of the syllable nucleus

According to Trubetzkoy, smooth cut is the unmarked case. Languages without a syllable cut opposition usually only have smooth cut. E.g., in Czech, both syllables with long vowels and syllables with short vowels are smoothly cut. By substituting their native long vowels in German syllables with smooth cut and their short

vowels in syllables with abrupt cut, native speakers of Czech produce a major component of what native speakers of German perceive as a Czech accent.

2. Phonetic concomitants of the syllable cuts

The way the syllable cuts are defined, they make understandable a wide range of phonetic properties which cluster in the two types of syllables, cf. (3).

- | | | |
|-----|--|--|
| (3) | <i>smoothly cut syllables</i> | <i>abruptly cut syllables</i> |
| | vowel: peripheral tense
long under accent
diphthongal under accent in certain dialects | vowel: centralized lax
short
monophthongal |

Smoothly cut syllables have peripheral and tense vowels, abruptly cut syllables have centralized and lax vowels. The reason is the following. In the unmarked syllable type, the smoothly cut syllables, vowels assume their defining positions, which are in the periphery, and they assume the unmarked value for tenseness of vowels, which is tense rather than lax; in some dialects, the peripheral and tense character of the vowels is underlined by outgliding diphthongization, especially under accent, or rather, more generally, in rhythmically prominent syllables. By contrast, in the marked syllable type, in which the energy expenditure increases throughout the peak of the syllable, there is not enough time to reach the defining positions of the vowels; rather, these positions are only approximated, which means that the vowels are lax and centralized, and that they do not diphthongize. It also follows that vowels in abrupt syllables are short; it would be unnatural to continue increasing the energy expenditure in a syllable for an extended period of time, such that the vowel could be perceived as long. In smoothly cut syllables, however, vowels are not in the same way limited to quick production; rather they will assume a natural measure of temporal extension, which is greater in accented than in unaccented syllables; and indeed, only the vowels of smoothly cut syllables are perceived as long, and only under accent, or rather in rhythmically prominent syllables.

Traditionally, the vowel differences themselves are viewed as the

defining properties, and there has been an unending discussion of the question which of the phonetic properties are basic, and which redundant. This question is no longer relevant in the syllable cut theory: All those segmental properties are but phonetic concomitants of the real opposition, which is a prosodic opposition, namely a difference in the energy distribution within the syllable.

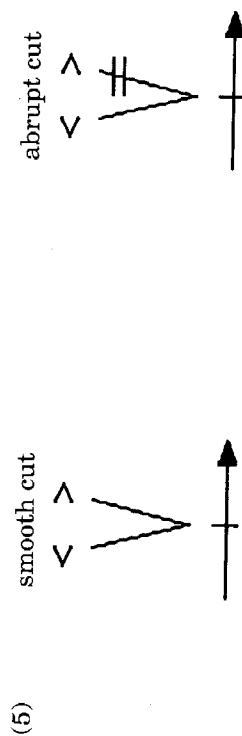
3. "Structural" concomitants and graphic representation of the syllable cuts

The greatest value of this prosodic theory of the relevant contrast, the syllable cut theory, lies in the predictions it makes for the phonotactic and accentual properties – the "structural" properties – of the two types of syllables, cf. (4).

(4) smoothly cut syllables abruptly cut syllables

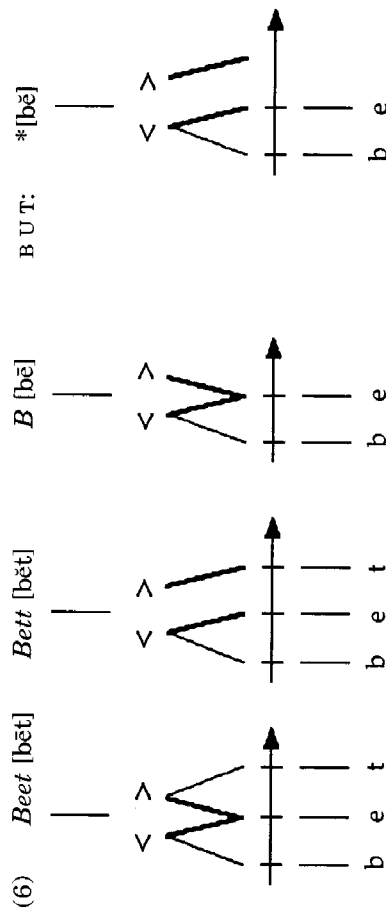
<i>final:</i>	closed or open	only closed (<i>naturā</i>)
<i>non-final:</i>	closed or open	only closed, viz. either <i>naturā</i>
<i>in hiatus:</i> ¹	possible	or else by ambisyllabicity
<i>weight:</i>	light if open	impossible
		always heavy

All of these structural properties follow naturally from the definitions of the syllable cuts, whereas it is less easy to see how they should follow from segmental properties of vowels. This is most transparent if a notation is adopted from Sievers by which energy contours are represented as pairs consisting of a CRESCENDO (<) and a DECRESCENDO (>) and if smooth cut and abrupt cut are represented as in (5).

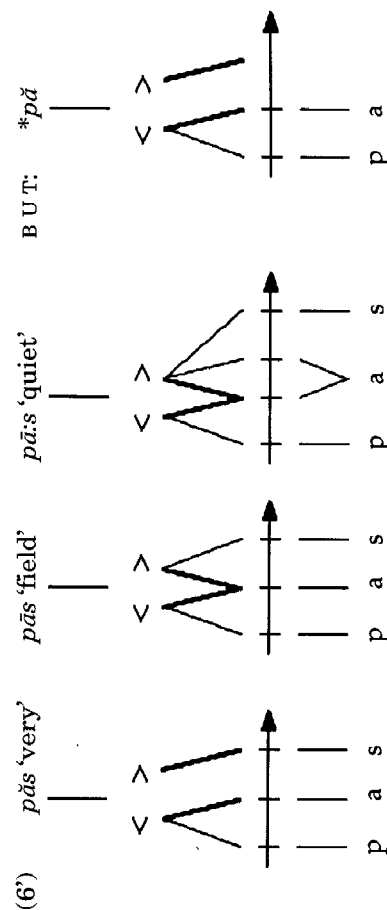


In words: The last connection line from the crescendo to the time arrow and the first connection line from the decrescendo to the time

arrow – the 'critical connection lines', as I call them – run to the same time point, the 'peak', under smooth cut but do not do so (and thus run to different time points) under abrupt cut. Under abrupt cut the second critical connection line requires a further speech sound following the peak to hook onto. The representations in (6) show in particular that an open word-final syllable with abrupt cut is unlikely to occur: The decrescendo would remain unconnected.²

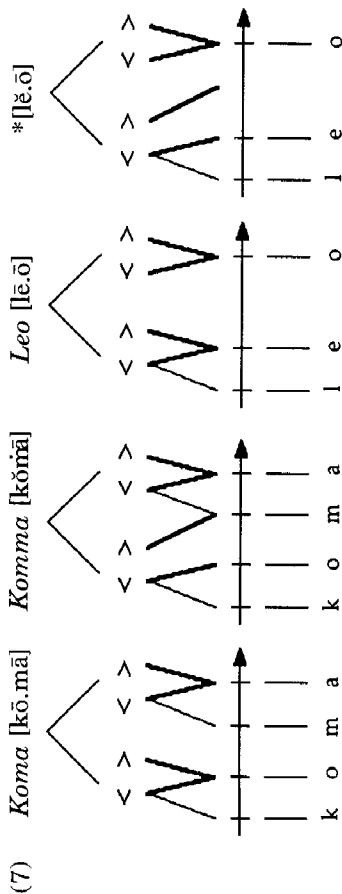


Hopi, which has in this regard been analysed by Trubetzkoy (1939: 176f., 1969: 179f.)³, has the same constraint but differs in that it has a length opposition in addition to the syllable cut opposition, cf. (6').

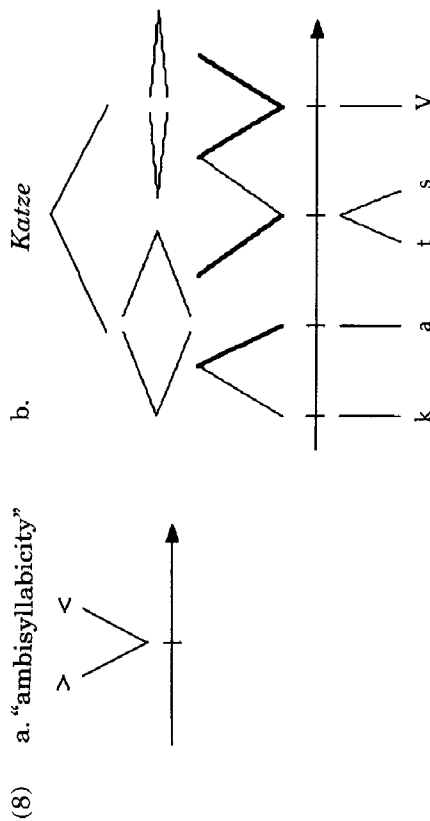


Hopi has other phonological constraints as well which only make sense in a frame-work attributing to this language a contrast of syllable cutting as proposed by Trubetzkoy (1939) and Whorf (1946).⁴

Producing abrupt cut in an open syllable is only possible if another syllable follows within the same word. Furthermore, this second syllable cannot be naked⁵ but has to be covered, because only a speech sound from the head of the following syllable can be used to cut the preceding syllable abruptly. This is shown in (7).

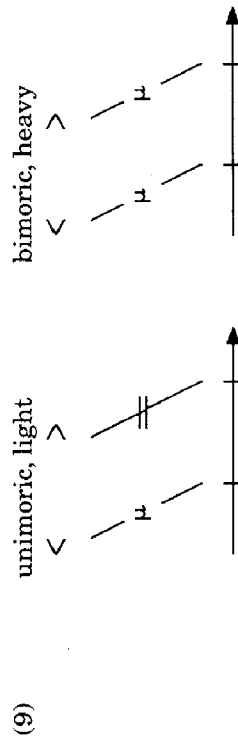


The representation of the word *Komma* in (7) very directly, and in an intuitively appealing manner, shows the nature of ambisyllabicity which results from producing abrupt cut in an open syllable: Since the first consonant in the head of the following syllable belongs to the crescendo of that syllable but is at the same time used as a landing site for the decrescendo of the abruptly cut first syllable, that speech sound is associated with both the decrescendo of the first and the crescendo of the second syllable. The essential configuration is shown in (8.a), which may serve as a definition of AMBISYLLABICITY.⁶ Speech sounds associated with a time point so configured would be 'ambisyllabic' – or a 'syllable link' – in this frame-work; e.g., the affricate in the word *Katze* 'cat' can be seen to be ambisyllabic in (8.b). – The example in (8.b) is chosen in such a way that the representation of reduced syllables is illustrated: Reduced syllables are syllables with an imperfectly developed energy contour. Such syllables are not suited for contrastive syllable cut; I represent them with the unmarked case, smooth cut.



4. Nuclear phonology: quantity, stability, final devoicing, and denuclearization

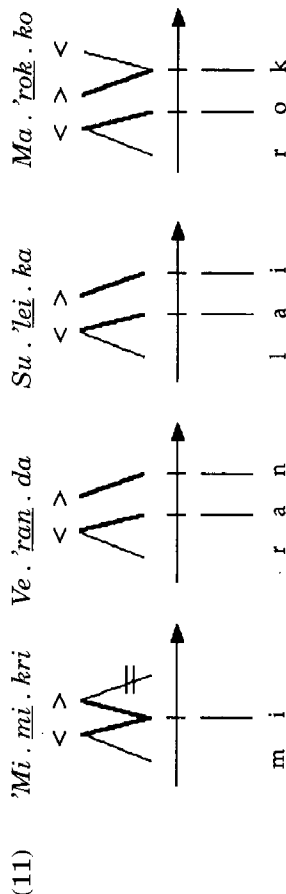
In my 1994 article I draw attention to the fact that in this theory the syllable does not have the status of a basic concept but is merely epiphenomenal: It may be defined as the totality of properties clustering around an energy contour. This reflects the intuition that whereas syllable boundaries are notoriously difficult to determine, and in many cases not at all, it is usually quite easy to say how many syllables, namely how many nuclei there are within a word or more complex expression. I therefore call such theories 'nuclear phonologies', contrasting them with the syllabic phonologies of, e.g., my articles of 1972 and 1978. I demonstrate in the 1994 paper that such theories, besides handling the problems they have been designed for, accommodate many traditional problems with equal ease, including the description of the classical quantity languages without syllable cut oppositions. E.g., the definition of syllable weight in (9) applies to both the classical quantity languages (those with a length contrast in vowels) and the non-classical languages such as German (which lacks a quantity contrast).



This definition is central to one of the most important German word accent rules, the penult rule, R4 in Vennemann 1990: 407, cf. (10).

(10) PENULT RULE: The accent does not retract beyond a heavy penult.

The first example in (11) shows how a light penult lets the accent pass to the antepenult whereas a heavy penult does not, irrespective of whether the heaviness of the penult results from *naturā* closure, from diphthongality, or from ambisyllabic closure owing to abrupt cut. The point is that *'Mi.mi.kri* could also be *Mi.'mi.kri*, compare *Bi.'ki.ni*, whereas *'Ve.ran.da*, *'Su.lei.ka* and *'Ma.rok.ko* would not be well-formed.

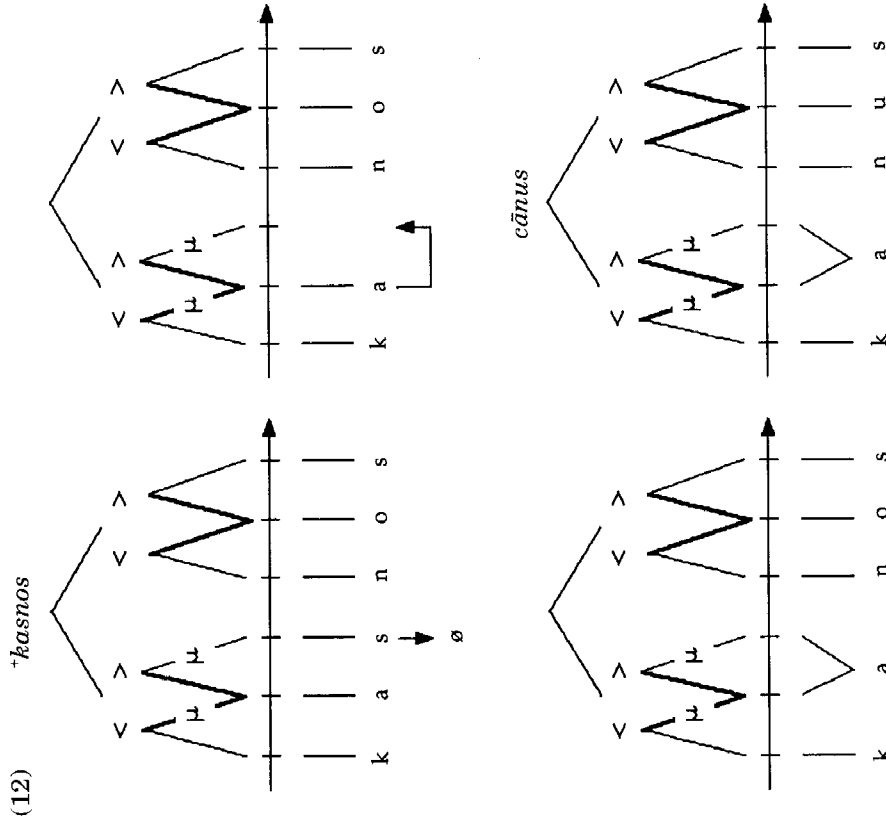


Dutch works the same way. It has a single set of vowels (essentially the same set as Standard German), without a quantity opposition (in either vowels or consonants), but with differences of tenseness relating to the syllable cuts (with neutralization of certain vowel oppositions under abrupt cut), and with ambisyllabicity. My "Skizze der deutschen Wortprosodie" (1991b) could be translated with only few orthographic adjustments of the examples into a "Sketch of Dutch word prosody"; and Vennemann 1990 too can be read, with only few modifications, as a sketch of Dutch accentology. This is not surprising, because both Standard German phonology and Standard Dutch phonology have developed on closely related Low German dialectal substrata. That Dutch is not a quantity language but rather a syllable cut language was already known to Trubetzkoy (1939: 176). The current literature on Dutch accentology, e.g. van der Hulst 1984, Trommelen & Zonneveld 1989, and Trommelen 1991, treats Dutch as a quantity language and is thereby faced with the paradox that penult syllables with a "long" vowel count as light in the penult rule, whereas penult syllables with a "short" vowel there count as heavy.

That literature thus provides an inadequate picture of Dutch phonology in general, and of Dutch accent in particular.

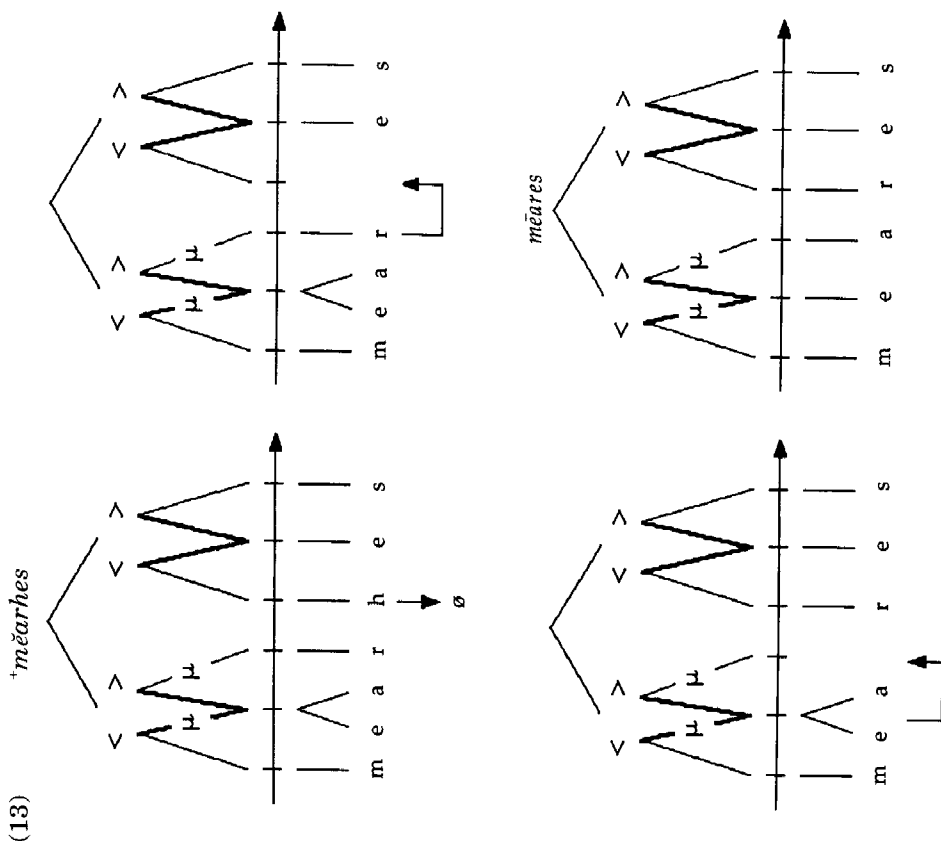
It remains to be investigated to what extent such shared features as those between German and Dutch only reflect a common history or also rest on a typological basis: syllable cut languages versus quantity languages.

Also the well-studied stability phenomena are handled in an immediately obvious and intuitive fashion. E.g., intra-syllabic compensatory lengthening is illustrated with Lat. *cānus* 'grey' (nom. sing. masc.) in (12).

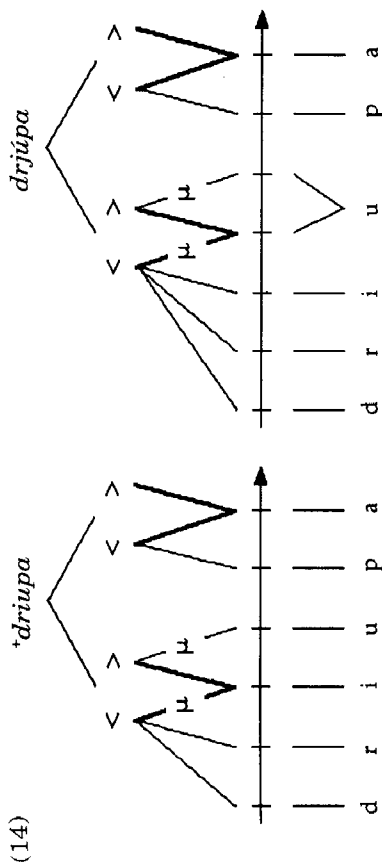


Inter-syllabic compensatory lengthening is illustrated with Old Engl. *mēares* 'horse' (gen. sing.) [nom. sing. *mēarh*] in (13), which shows at

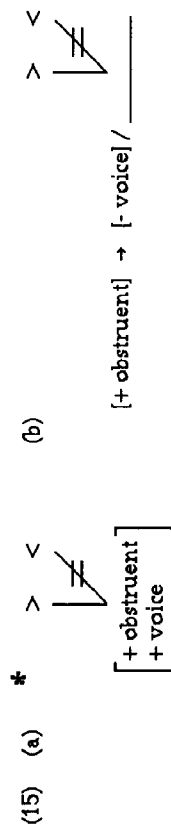
the same time how the way of handling short and long diphthongs (in the example: *ēā* vs. *ēā*) carries over from other theories that also employ a time arrow.



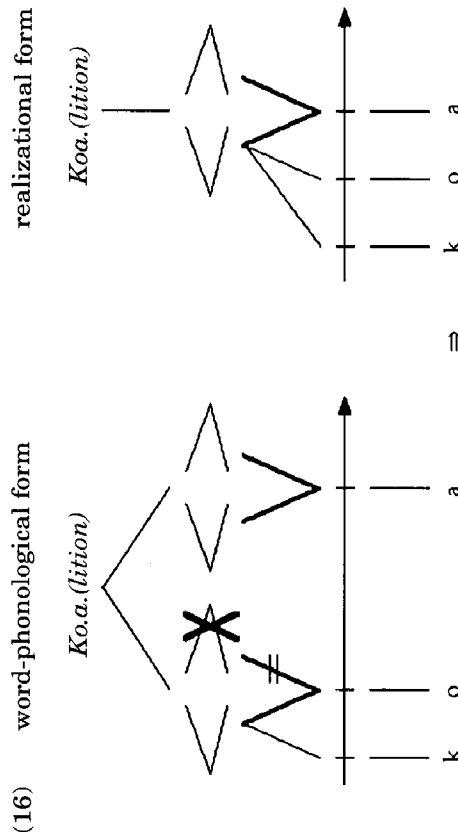
Number (14) illustrates with Old Icel. *drjúpa* 'to drip' the so-called *Akzentumsprung*, i.e. the shift of the peak position from the first to the second component of a diphthong, with compensatory lengthening preserving the heaviness of the affected syllable.



Number (15) shows how interactions between segmental and syllable cut structure may be expressed. (15.a) shows the German rule of coda devoicing. The way it is formulated, it is actually decrescendo devoicing. That is indeed quite pleasing, because the decrescendo is defined as a phase of diminishing energy, and devoicing is one manifestation of this slackening of energy expenditure. (15.b) shows the morpho-phonemic process, or rule of internal sandhi, the language uses to meet the phonological constraint. It can also be read as a phonological rule in a transformational grammar.⁷



Finally, number (16) shows how the transformations of realizational phonology can be handled. The example shows a case of denuclearization in Colloquial Standard German, represented as the deletion of a decrescendo resulting in the merger of the two contiguous crescendos into one.



5. Syllable cuts, syllable structure, and cutting consonant strength

In the remaining sections I would like to investigate the following proposal. English and Icelandic too went through a stage with the syllable cut prosodies as the basic opposition. This opposition had developed in all three languages before the major so-called quantity changes occurred. The so-called quantity changes, I propose, were in reality indications of this fundamental reorganization of the phonological system: They were syllable cut changes, viz. positional neutralizations of the two kinds of syllable cut in favor of the positionally unmarked case. The default is expressed in the following rule:

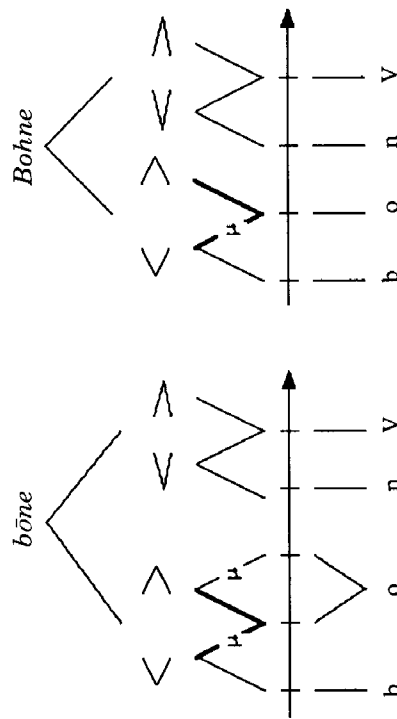
- (17) CORRELATION DEFAULT: Everything else being equal, the preferred correlation of syllable structure and syllable cut is: smooth cut in open syllables, abrupt cut in closed syllables.

But everything else is rarely equal. Thus, there are deviations in both directions. They follow from the very way the syllable cuts are produced. In order to achieve abrupt cut, a consonant is needed to cut the end of the syllable peak. Such a consonant is the more suited to serve this purpose the more consonant-like it is – the stronger, in terms of hierarchies of consonantal strength. The more vowel-like – the weaker – the consonant is, the less suited it is for producing abrupt cut.

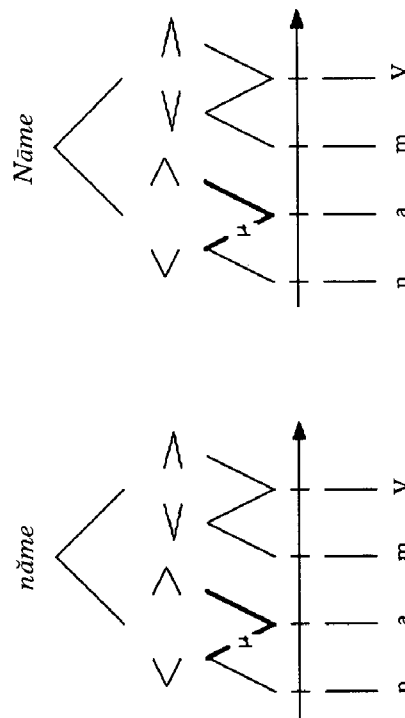
I would like to illustrate this with examples from German.

Accented open syllables preserved or acquired smooth cut in late Middle High German, in harmony with the default. E.g., *bōne* (with a long vowel) became *Bōhne* 'bean' (with smooth cut), *nāme* (with a short vowel) became *Nāme* 'name' (likewise with smooth cut), cf. (18.a-b).

(18) a. Middle High German: long vowel Standard German: smooth cut



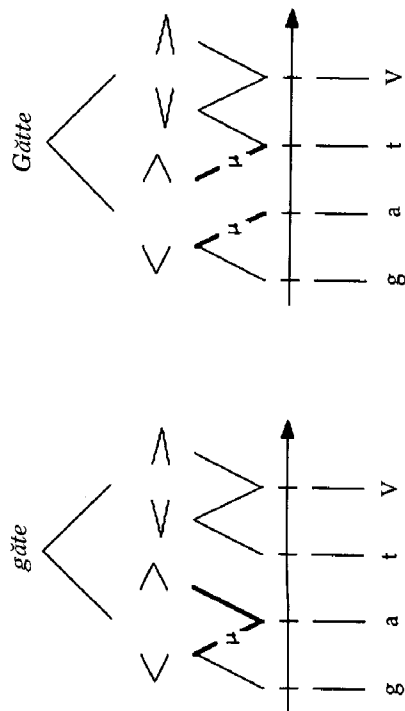
b. Middle High German: short vowel Standard German: smooth cut



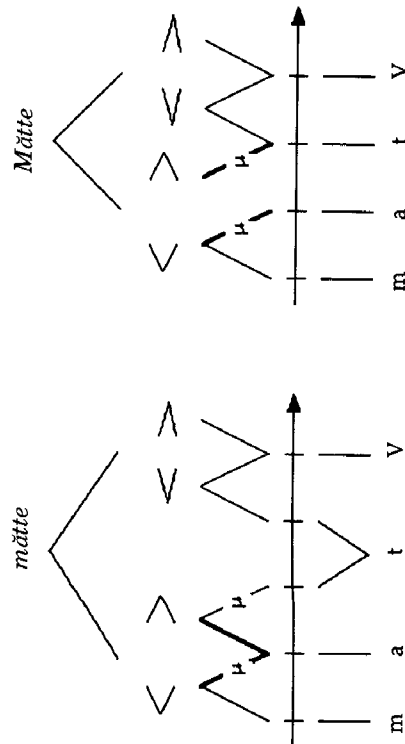
There are exceptions of various kinds, but one is noteworthy in this context: Before the strongest consonant of the system, the dental voiceless plosive *t*, accented open syllables often acquired the wrong

cut, namely abrupt rather than smooth cut, with concomitant ambisyllabicity of the plosive; e.g., *gäte* became *Gätte* 'husband', cf. (18.c). The result of the deviant kind of development thus is the same as for geminates, which naturally produce abrupt cut and then wind up as ambisyllabic consonants by way of degemination, cf. (18.d).

(18) c. Middle High German: short vowel Standard German: abrupt cut

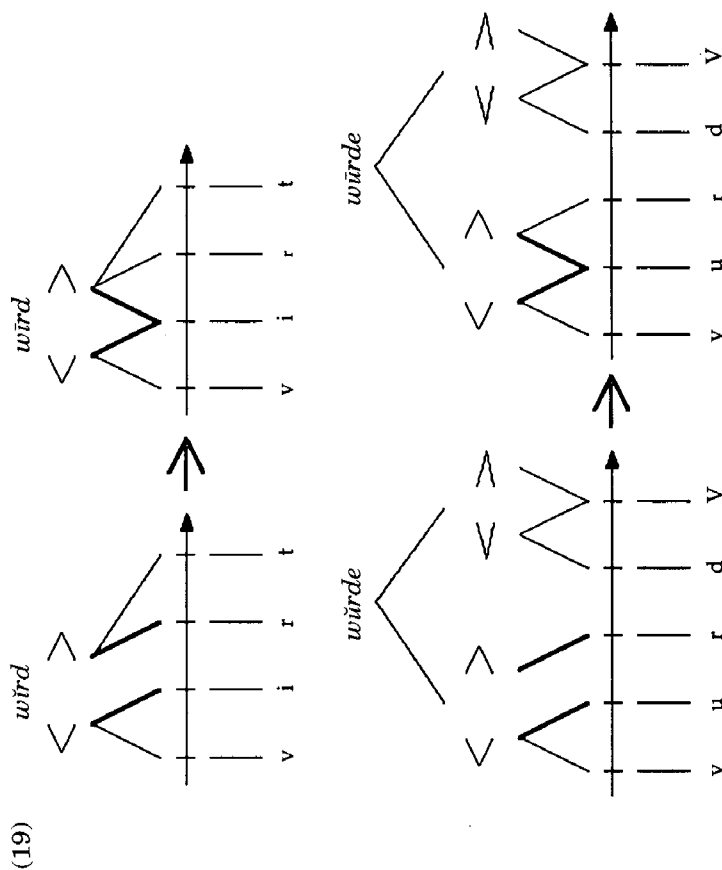


(18) d. Middle High German: short vowel, geminate Standard German: abrupt cut, ambisyllabicity



Conversely, in Modern Standard German, numerous speakers change the abrupt cut of closed syllables into smooth cut, but only before the weakest consonant of the system, the central liquid, *r*, which in those

varieties of German is quite vowel-like (suggested here by smaller type), so that some linguists consider it the second component of a diphthong; cf. (19). In terms of Lutz 1991, this *r* has little inherent strength and little positional strength: little inherent strength because of its low position in the hierarchy of consonantality, and little positional strength because of its occurrence in a coda, especially before a homorganic consonant.



It is well known that in English too the opposition between the assumed two sets of vowels is neutralized before *r*. The German examples in (19) clearly show that this is not a case of lengthening, because Contemporary German is not a language with a phonological quantity opposition in vowels.

6. So-called lengthening before certain consonant groups in English

I will now look at some of the Late Old English and Middle English changes before certain consonant groups. I follow Berndt

1960, but much the same material can be found in all good handbooks.⁸ Traditionally there is lengthening before the groups in (20).

- (20) *-nd -ng -mb -ld*; also: *-rð -rs-* before vowels; less: *-rð -rl -rn*
Especially /a e o/, but also /i u/, mostly before *-nd*.

Many of the instances of change later reverted. The changes are best recognizable if the result went through the Great Vowel Shift, e.g. in the French loans *manger* [meindʒər] and *chaunge* [tʃeindʒl], but also in those in (21).

(21)	<i>nd</i>	OE	ME	ModE
		<i>findan</i>	<i>finden</i>	<i>find</i> [aɪ]
		<i>wind</i>	<i>wīnd / wind</i>	<i>wind</i>
		<i>Ʒecynde</i>	<i>kīnde / kȳnde</i>	<i>kind</i>
		<i>Ʒrund</i>	<i>grūnd</i>	<i>ground</i> [aʊ]
		<i>hund</i>	<i>hūnd</i>	<i>hound</i>
		<i>pund</i>	<i>pūnd</i>	<i>pound</i>
		<i>hie fundon</i>	<i>fūnde</i>	<i>found</i>

ng ("lengthened" until the 14th century, cf. Bernd 1960: 18f., then "shortened" again – probably because the *g* was lost, cf. Lutz 1991: 190)

<i>mb</i>	<i>climban</i>	<i>climben</i>	<i>climb</i> [aɪ]
	<i>camb</i>	<i>cāmb > cōmb, coomb</i>	<i>comb</i> [oʊ]
	<i>wamb</i>	<i>wāmb, wōmb(e)</i>	<i>womb</i> [u:] (<i>w-m</i> !)

ld

	<i>ald</i> (Angl.)	<i>āld, ǣld</i>	<i>old</i> [oʊ]
	<i>cald</i>	<i>cāld, cōld</i>	<i>cold</i>
	<i>haldan</i>	<i>hālden, hōlden</i>	<i>hold</i>
	<i>fēld</i>	<i>fēld, feeld</i>	<i>field</i> [i:]
	<i>Ʒeldan</i>	<i>Ʒelden, Ʒeeldan</i>	<i>yield</i>
	<i>scēld</i>	<i>scēld, sheeld</i>	<i>shield</i>
	<i>čild</i>	<i>čild</i>	<i>child</i> [aɪ]
	<i>milde</i>	<i>milde</i>	<i>mild</i>
	<i>wilde</i>	<i>wilde</i>	<i>wild</i>
	<i>Ʒold</i>	<i>Ʒōld, Ʒoold</i>	<i>gold</i> [oʊ], dial. [u:]

rd

	<i>beard</i>	<i>bēard > bērd</i>	<i>beard</i> [i:]
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The changes did not occur if a third consonant followed within the cluster, such as in *children* as opposed to *child*.

These changes involve closed syllables with the weakest conson-

ants of the system following the syllable peak. That is indicative of a transition to smooth cut. Thus when Minkova & Stockwell (1992) speak of these changes in terms of "homorganic clusters as moric busters" (cf. the title of their paper), they place the development in the wrong domain: In terms of mora counting these changes make no sense.

7. So-called shortening before certain consonant groups in English

There is not only so-called lengthening but also so-called shortening before certain consonant groups in Middle English, a process which is still reflected in many word pairs in Modern English, cf. (22).

- (22) a. before groups of two strong and voiceless consonants:

five [aɪ] *fifty* [ɪ] *sleep* [i:] *slept* [ɛ]
keep [i:] *kept* [ɛ] **scraft* > *sōft* > *soft* [ɔ]

- b. before groups of one strong, voiceless consonant plus a liquid:

ūt / ūtra > *out / utter* (ly) [aʊ] / [ʌ]
nædre > (n)adder [æ]
lytel, inflect. *lytles*, *lytlum* > *little* [ɪ]

- c. before groups of nasal or *l* plus a strong voiceless consonant:

twēnty > *twenty*
clæn / clænstan > *clean / cleanse* [i:] / [ɛ]
fēl / fēlte > *feel / felt* [i:] / [ɛ]

- d. before groups of two weak and voiced sounds [viz. *dd* (*ll*):

blēdan / blēdde > *bleed / bled* [i:] / [ɛ]
lædan / lædde > *lead / led* [i:] / [ɛ]
f(ē)allan / f(ē)oll-ƿollton > *fall / fell* [ɛ] (debated)

- e. in compounds with a closing plus an opening consonant [upon univerbation]:

OE *čęapman* > ME *chāpman*
OE *Ʒōdspell* > *Ʒōdspel* (l) > Late ME *gōspel*
OE *wīfman* > *wīfman* > *wimman* > ME *wīm(m)an*,
wīm(m)on, *wōman*

- f. in first syllables of trisyllabic words:

sūð > *south* [oʊ], but *sūðerne* > *sūðerne* > *southern* [ʌ]
OE (Angl.) *ald* > *āld*, *ǣld* > *old* [oʊ], but *aldorman*
> *āldorman* > ME *ālderman* (Orrm *alldermann*)

Of course we may also add the most famous *wild/wilderness* example and the numerous borrowed pairs such as *divine/divinity*, *serene/serenity*, *sane/sanity*, *profound/profundity*, *cone/conical* etc.

My explanation of these changes is the following. As already mentioned, everything else being equal, the preferred correlation of syllable structure and syllable cut is: smooth cut in open syllables, abrupt cut in closed syllables. In the preceding instances we are dealing with closed syllables. Thus, we expect changes toward abrupt cut. And indeed, the various factors perceptively identified and named by Berndt are no hindrance to such a development but are, on the contrary, conducive. In words with antepenult accent (mostly trisyllabic words accented on the first syllable), the vowel of the accented syllable is very short. By developing abrupt cut, these syllables preserve that shortness, even against the tendency toward open syllable smoothing (see next section).

8. So-called open syllable lengthening in Middle English

The so-called Middle English lengthening of accented vowels in open syllables ("open syllable lengthening") likewise is no change of phonological vowel quantity. It cannot be, because by its nature it is the annihilation of phonological quantity: It eliminates the very basis for classical quantity, the opposition of light and heavy syllables (under accent). After the change, originally light syllables and originally heavy syllables are no longer metrically distinct. Cf. the examples in (23).

(23) lengthening of originally short vowels in accented open syllables; common to all dialects is the lengthening of the short vowels *a*, *e*, *o*:

āpa > *āpe* > *ape* [eɪp] *efen* > *ēven* > *even* [i:vən]
ōpan > *ōpen* > *open* [oʊpən] *stēlan* > *stēlen* > *steal* [sti:l]

dialectal lengthening: *ī ū* > *ē ō*; e.g. Northumbrian:

shīp, *shīpes* > *shēpes* 'ships'
wīdwe > *wīdow* > *wēdow*, but plur. *wīdowes*
sūmor > *sūmer* > *sōmer*, but *sūmeres*

That kind of change in particular should be considered the transition of accented open syllables to smooth cut rather than to length, exactly as shown earlier for German.

Minkova (1982) assumes a kind of quantity calibration contingent on the loss of a final schwa. Also Lass, in his 1985 reply, discusses the matter in terms of quantity. But Middle English was no longer a quantity language, as shown by these very changes: In a quantity language (with trochaic rhythm), a CVCV foot is equivalent to a CVC foot rather than a CVVC foot; cf. (24).

(24) $\underline{C\tilde{V}}^*CV > CVC$ (metrically equivalent by resolution)
 $\underline{C\tilde{V}}^*CV > \underline{CVVC}$ (makes no sense in a quantity language)⁹

By contrast the type of change in (25) makes perfect sense, because it establishes a natural correlation between open syllable structure and smooth cut.

(25) $\underline{C\tilde{V}}^*CV > \underline{C\tilde{V}}^*CV$ (if the basket before the change is interpreted as vowel shortness and the macron after the change as smooth cut)

Minkova wants to account for the fact that "open syllable lengthening" occurred much more regularly in words with penult accent (mostly disyllables) whose final syllable used to end in schwa than in words whose final syllable ended in a consonant. She seeks the reason in a special behavior of final schwa: the fact that it, but not final consonants, could be elided. But comparing the English changes to their German counterparts immediately shows that she is looking in the wrong direction: It is not the words ending in schwa that behaved in a special way but the words ending in consonants: In Standard German, final schwas are usually preserved to the present day, and yet there is the same differential development that Minkova wants to account for. In particular, there are numerous German words where a short vowel "remained short" before consonantal (resonant) suffixes and "suffixoids", and even cases of long vowels "shortening" in such positions: e.g., Middle High German *hamer* 'hammer', *jāmer* 'misery', Standard German *Hammer* /häm̩r/, *Jammer* /jäm̩r/ rather than /hā.mr̩/, /jā.mr̩/; yet *nāme* > *Name* /nā.mə/ 'name', *sāme* > *Same* /zā.mə/ 'seed'. Since there is no reason for assuming that the English changes were motivated by different factors than the German ones, English "open syllable lengthening" too is independent of the loss of schwa.¹⁰

Although "open syllable lengthening" is in my theory not lengthening, it is still an open syllable change: Open syllables tend to develop (or preserve) smooth cut, and English gave in to this tendency as its quantity system weakened and broke down. The problem is that

there are contrary tendencies which interfere with a general transition of open syllables to smooth cut.¹¹

One such contrary tendency I have already pointed out in the presentation of the Middle High German examples: the special cutting potential of voiceless plosives which may sporadically keep phonologically short vowels phonetically short by inducing abrupt cut rather than the smooth cut developing according to the open syllable rule.

Another contrary tendency develops from the phonetic fact that high vowels have less inherent duration than non-high vowels: This difference may sporadically, or even to some extent regularly, be respected in the general transition of open syllables to smooth cut by developing abrupt cut in syllables with high vowels, thereby keeping the high vowels phonetically short.¹²

It is the third contrary tendency, however, which is most germane to Minkova's problem: a tendency of consonantal nuclei to push marginal segments away from their syllable: The less vowel-like a nucleus, the less its potential to bond surrounding consonants to itself. Consonantal nuclei are universally disfavored, but if they are tolerated in a language this complexity is usually alleviated by not combining them with complex margins. In the words of Bell (1978: 162): "Syllabic consonants exhibit a strong preference for occurring in syllables without margins or with margins markedly simpler than those found in syllables with vocalic nuclei."¹³ As always, syllable structure complexities are even less favored in unaccented syllables than in accented ones, whereas accented syllables are quite ready even to attract consonants from their environment. Thus it is not surprising that head consonants are pushed from the syllables we are looking at toward the preceding syllables; this makes the consonants ambisyllabic, which is equivalent to saying that the preceding syllables become abruptly cut.

Minkova (1982: 42) stresses the fact that in her account "MEOSL [Middle English Open Syllable Lengthening] affects the vowel in a much more restricted environment" in that it "operates unfailingly *only* in cases when there is syllabic restructuring in ME, i.e. when the second syllable of the original form is lost due to final schwa deletion in ME." But there are many cases of open syllable lengthening in other environments as well, for which I have found no account in Minkova's treatment. She seems to assume that her description is better than the traditional ones because it leaves fewer exceptions; thus, she says of the traditional open syllable account:

"The label 'exception' as referring to disyllabic forms in Modern English is observationally inadequate; the vowels in such forms *do not* get lengthened by MEOSL and it is surprising that so much energy has been expended in trying to account for 'exceptions' which make up over 80% of the entire material" (Minkova 1982: 42).

I consider this pronouncement methodologically wrong. It is much better to have a rule with over 80% exceptions than having no rule at all, which means having 100% exceptions (viz. in the corpus outside the portion covered by Minkova's narrow rule). Grimm's Law has almost as many exceptions, and the great amount of energy expended by other scholars in trying to account for them has shown that it was essentially correct.

9. Some related changes in Icelandic

My interpretation of the Old and Middle English developments is not only supported by the German analogs but also by changes both in Modern and in Old Icelandic. In Icelandic, lax vowels have changed into tense vowels before *ng* and *nk*, i.e. velar and palatal groups of nasal plus plosive (Pétursson 1978: 62, Einarsson 1945: 9), cf. (26). The change has occurred in historical time, as it is not regularly (but only occasionally, as a matter of personal style) reflected in the writing system:

(26)	<i>i > í</i>	[i > i]	<i>syngja</i> (<i>sýngja</i>)	[sɪnca]	'to sing'
	<i>u > ú</i>	[u > u]	<i>ungur</i> (<i>úngur</i>)	[uŋgʏr]	'young'
	<i>e > ei</i>	[ɛ > ei]	<i>lengi</i> (<i>leingi</i>)	[leɪnɔt]	'for long'
	<i>o > ó</i>	[ɔ > ou]	<i>kongur</i> (<i>kóngur</i>)	[kounɡʏr]	'king'
	<i>ö > au</i>	[ö > öy]	<i>löng</i> (<i>laung</i>)	[lœyŋɡ]	'long'
	<i>a > á</i>	[a > au]	<i>langur</i> (<i>lángur</i>)	[launɡʏr]	'long'

I interpret this change as a transition from abrupt cut to smooth cut. The change suggests that prior to it, Icelandic had passed from a quantity system to a syllable cut system, because clearly these changes, having occurred in closed syllables, would not be motivated as lengthenings. As a matter of fact, the results of the change, both monophthongs and diphthongs, are short in terms of the newly developed Icelandic vowel length opposition.

Even Old Icelandic shows first signs of such a transition. E.g., in accented word-final position short vowels are "lengthened" (Ranke & Hofmann 1967: § 10.1), cf. (27).

- (27) Goth. *sa* 'this', *þu* 'thou', *ni* 'not'; Olcel. *sá*, *þú*, *né*

Also, before *h*, all vowels are "lengthened" (in addition, high vowels, both short and long, are lowered); *h* is then lost, or assimilated to a following *t* (Ranke & Hofmann 1967: § 10.2), cf. (28).

- (28)
- | | | | | | | | |
|--------|---------------|--------------|------------|----------------|--------------|---------------|-------------------|
| | Goth. | Goth. | Goth. | OHG | OHG | Goth. | OHG |
| | <i>stahan</i> | <i>ahtau</i> | <i>aha</i> | <i>richten</i> | <i>wi</i> | <i>leihts</i> | <i>suht</i> |
| Olcel. | <i>slá</i> | <i>átta</i> | <i>ó</i> | <i>rétta</i> | <i>vé</i> | <i>létt</i> | <i>sótt</i> |
| | 'to slay' | | | 'water' | 'straighten' | 'sanctuary' | 'light' 'illness' |

Vowels are further "lengthened" (and lowered) before runic *R* (< PGmc **z*, Ranke & Hofmann 1967: § 10.6), cf. (29).

- (29) Goth. *mis*, PNorse **miR* > Olcel. *mér* 'me (dat.)'
Goth. *uz*, PNorse **uR* > Olcel. *ór* 'out of'

Within Old Icelandic, from about 1200, non-palatal short vowels (*a*, *o*, *ø*, *u*, also as part of the "breaking" diphthongs, *ia* and *io*) are "lengthened" before non-homorganic groups with *l*, sporadically also before *l* plus *s* or *n* (Ranke & Hofmann 1967: § 10.8), cf. (30).

- (30) *halmr* > *hálmr* 'blade' *ulfr* > *úlfr* 'wolf' *hals* > *háls* 'neck'
hjalpa > *hjálpa* 'to help' *folginn* > *fólginn* 'hidden'
hólf > *hólf* = *hálf* 'half (fem.)' *míolk* > *miólk* 'milk'

10. Conclusion

In this paper I have analysed a number of changes in German, English, and Icelandic that are traditionally labeled lengthenings and shortenings. I have studied them within a theory, nuclear phonology incorporating an opposition of syllable cuts (smooth cut and abrupt cut), which has been developed for independent reasons, viz. for the synchronic phonological description of Standard German and the Toreva dialect of Hopi. This theory is especially needed for a definition of syllable weight on which an adequate formulation of the accent rules of such languages as Standard German and Dutch (and to some extent of English) can be based, in particular the penult rule which says that the accent in these languages does not retract beyond a heavy penult. The curious point is that in these languages open syllables with a so-called long vowel count as light for the

penult rule, whereas open syllables with a so-called short vowel count as heavy – a paradox which immediately shows that a treatment of these languages in terms of a classical concept of quantity is wrong. The lesson to be learned from my analysis of the accent rules is that the inherited length opposition has been given up in these languages (it has also been given up in Icelandic), and that a system with a new opposition has arisen in which, in particular, syllable weight is no longer based on quantity but exclusively on the way the decrescendo of a syllable is associated with the time axis: A syllable is light if its decrescendo is entirely associated with the syllable peak, else heavy.

So-called lengthening in accented open syllables and shortening in closed syllables are recognized in this theory to reflect a transition to a natural correlation between syllable cuts and syllable structure: Smooth cut in open syllables, abrupt cut in closed syllables. Thus "open syllable lengthening" in particular is not a quantity change; it cannot be, because the change eliminates the very difference quantity systems are based on, that between light and heavy syllables depending on vowel length. Rather it reflects the loss of quantity and the transition to a new system.

The so-called shortenings treated in this article all occurred before consonants well suited to cut a syllable abruptly, especially if tautosyllabic but also otherwise.

The other cases of so-called lengthening treated in this article occurred in closed syllables, where no lengthening (in terms of mora addition) is to be expected. It was noted that the consonantal closure was in every case brought about by one of the weakest consonants in the language, and that in many cases that consonant is a member of a cluster which may be suspected to have an additional positionally weakening influence on it. Weak consonants are, however, ill suited for cutting a syllable abruptly. "Lengthenings" in closed syllables are thereby recognized as transitions into smooth cut, with length merely being a possible but not necessary concomitant of smooth cut under accent. In Icelandic, the "lengthening" of accented vowels before palatal and velar nasal clusters by necessity produces short monophthongs and diphthongs, because vowels in Icelandic are always short in non-final closed syllables.

Returning to German at the end of this article, I can with satisfaction cite Trost (1967) citing Sievers in connection with the first example in the final set of "lengthening" cases from Icelandic, cf. (30):

"[Sievers 1901: 598] verwies darauf, daß es bühnendeutsch z.B. auch *Halm* mit stark geschnittenem Akzent lautet. Zugleich aber betonte er [1901: 595], daß die Unterscheidung von stark und schwach geschnittenem Akzent, wie sie für das Bühnendeutsche gilt, im Deutschen nicht überall besteht: ein deutlich stark geschnittener Akzent fehlt einer Reihe von Mundarten und wo er vorhanden ist, wird er doch in Fällen wie *Halm*, *halten* nicht angewendet" (Troost 1967: 70).¹⁴

In other words, certain German dialects which, like northern varieties of the Standard language, have smooth syllable cut before clusters with *r*, have generalized the transition toward smooth syllable cut from clusters with *r* to clusters with *l*, i.e. to the consonant on the next rung in the hierarchy of consonantality: *Hālm* > *Hālm*, *hālm* > *hālm*. Therefore, since those dialects are no quantity languages it is once again revealed that the changes considered in this article are not primarily lengthenings and shortenings but improvements in the correlation between syllable structure and syllable cuts, partly in realization of the fundamental correlation default, partly as a function of the inherent and positional consonantal strength of the cutting consonants and other interfering factors.

Appendix: Quantity and syllable cuts in Chinantec (Meso-America)¹⁵

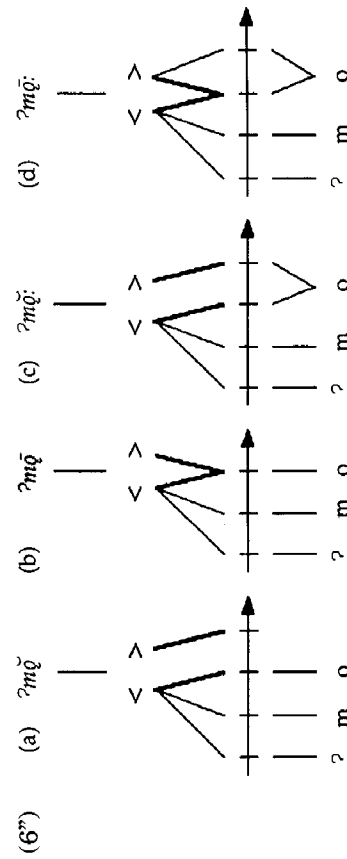
If I read the descriptions in Rensch 1978 correctly, the "ballistic syllables" and the "controlled syllables" of some of the Otomanguean languages of Meso-America form a contrast phonetically similar to the abruptly cut syllables and the smoothly cut syllables, respectively, of Standard German and Hopi (note especially Rensch's point 6):

"The varying realizations of the ballistic syllable [in Chinantec], transcribed as an accent ..., include combinations of the following features: 1) post-syllabic aspiration, 2) breathy articulation of the vowel, 3) voicelessness of syllable-final nasals, 4) fortis articulation of syllable-initial consonants, 5) differences in vowel duration, 6) late peak of intensity with sudden decrescendo, and 7) variant realizations of the tones" (Rensch 1978: 86).

In Chinantec, quantity and ballisticness (syllable cuts) combine freely, even in open syllables which in Standard German and Hopi only allow smooth cut; cf. the following minimal quadruple, all with the same level 2 tone (Rensch 1978: 86):

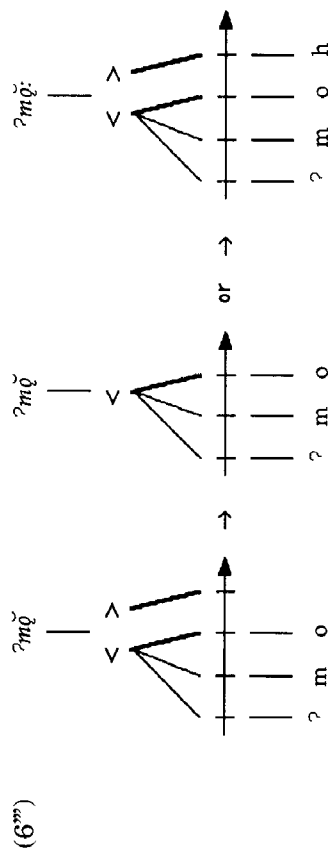
"controlled"		"ballistic"	
short vowel	<i>m̃q̃</i> 'round fish net'	<i>m̃q̃</i>	'horizontal rods in roof'
long vowel	<i>m̃q̃:</i> 'dew'	<i>m̃q̃:</i>	'death'

In Standard German, if abrupt cut is produced in an open syllable, such as the vocal gesture *Dāl*, some sort of glottalic closure may be observed (cf. Vennemann 1991b: 93, n. 12, referring to an observation made by David Restle). Compare to this Rensch 1978: 86: "A common manifestation of the ballistic syllable [in Chinantec] is post-syllabic aspiration, especially when the vowel is short." The abruptly cut syllables of Hopi have extra short vowels. Compare to this again Rensch 1978: 86: "Short vowels [in Chinantec] are typically shorter in ballistic syllables than in controlled syllables." The description of ballistic syllables with long vowels differs remarkably: "If there is a length difference, the long vowel in a ballistic syllable is typically longer than the long vowel in a controlled syllable. In long ballistic syllables there is a gradual increase of intensity until late in the nucleus after which there is a rapid decrescendo. By contrast, the peak of the controlled syllable comes earlier in the syllable with a sustained decay following." Evidently the syllable cut languages deserve an intensive and extensive phonetic as well as typological investigation; my naive initial suppositions (Vennemann 1991b: 92, n. 9) have all turned out to be wrong. – Meanwhile it is pleasing to know that the graphic representations of the syllable cuts first designed for Standard German do not only extend to Hopi, cf. (6), (6') in sec. 3 above, but also to Chinantec, cf. (6'').



Here smooth cut is shown with a short vowel in (b) and with a long vowel in (d), abrupt cut with a short vowel in (a) and with a long

vowel in (c). In abruptly cut syllables the decrescendo occurs at the very end of the peak. In my binary notation the interpretation is that the decrescendo falls outside the peak, normally into the following consonant. Since the syllable here is open, there is no landing site, so to speak, for the decrescendo: The syllable is all crescendo, the decrescendo falling outside it. Such syllables are thus characterized as defective, which is desirable in view of the fact that they tend to turn into regular syllables by accreting a closing glottal consonant, cf. (6^m).



The representation of abrupt cut with long vowels, cf. (6ⁿ.c), is straightforward: The decrescendo is withheld until the second half of the long vowel. Were it withheld until the very end of the entire nucleus, there would probably be more clearly phrased reports of final aspiration, as for the short vowels. Since this does not seem to be the case, (6ⁿ.c) seems to be the better representation than one modeled on the analogy of (6ⁿ.a).

Afterword

This paper was read at the 7th International Phonology Meeting, Krems, 4-7 July 1992. It was submitted in the present form, and accepted by the editors, for publication in the proceedings but – for reasons that need not be reconstructed – did not appear in that volume. Since it has played a role in the published and forthcoming work of others, and since I still consider both the general theory and the applications presented here correct, I have gratefully accepted Prof. Pier Marco Bertinetto's invitation to publish it in this journal.

Much work on quantity and on syllable cuts has been carried out

since this paper was written, some of it done in Munich, e.g. Becker 1998 and Restle 1998, some elsewhere, e.g. Maas & Tophinke 1993, Maas 1999 (passim), and Spiekermann 2000. In my own work these prosodies have continued to play a major role, cf. Vennemann 1995 and 1998.

The most direct continuation and ingenious application of the account of prosodic change begun in the present paper is Robert W. Murray's research on the transition from quantity to syllable cuts in Middle English recognizable in the work of poets and orthoepists (Orm, Chaucer, Gower, Hart), cf. Murray 1995, 2000, and his forthcoming monograph, with references to, and discussion of, many relevant publications on these prosodies.

Several articles on syllable cuts will appear in the proceedings of a conference on syllable cut and pitch accents, Spiekermann (ed.) in prep. The volume will also contain a report on recent research into phonetic correlates of the syllable cuts by Helmut Spiekermann and by Michael Jessen. This is a topic on which I, as a phonologist, have little to say and should have remained silent in the first place; certainly the impressionistic references to "energy contours" in the paper above should eventually be replaced by the objective acceleration-based concepts of articulatory phonetics. Meanwhile the interested reader may want to study the work done in the Institut für Phonetik of the University of Munich, e.g. Hoole *et al.* 1994 and various papers in the Institute's *Forschungsberichte (FIPKM)*, e.g. Kroos *et al.* 1997 and Mooshammer 1998. Since my phonological notations, both graphic and diacritic, are, like any other phonological system, merely a syntax calling for the correct semantic interpretation in phonetic terms, and since the prosodic account of the syllable cut contrast is strengthened rather than weakened by that experimental research, those phonetic findings give no reason to change the phonological theory.

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Notes

- ¹ I.e., where an open syllable (one with an empty coda) is immediately followed by a naked syllable (one with an empty head).
- ² In the graphic representations, every word λ (e.g. *Beet*) is assigned a phonological word form $\phi(\lambda)$ and connected to it by a connection line; $\phi(\lambda)$ in turn is assigned a sequence of energy contours, etc. In order to save space, I have omitted the intermediate horizontal row showing the ϕ 's and their connection lines.
- ³ The reconstruction of Trubetzkoy's proposal attempted in a version of "metrical phonology" by Anderson (1984) was only a partial success. Cf. the discussion and further analyses in Vennemann 1994, sections 5 and 7.
- ⁴ Standard German may give the impression that the syllable cuts are merely an alternative manifestation of quantity differences, and indeed most phonologists of German have come to believe precisely that. I myself used to believe that syllable cuts and quantity were different kinds of opposition, but I nevertheless thought for a while that a syllable cut opposition would never coexist with a quantity opposition in the same language until I studied Trubetzkoy's account of Hopi more closely: Hopi shows that syllable cuts and quantity are, on the contrary, independent phonological parameters which may indeed coexist within the same language system. I then thought – on the evidence of German where only smooth cut can cooccur with phonetic length, and especially on the evidence of Hopi where only short vowels may occur with both cuts – that even if the two parameters were employed within the same language system, there would be a constraint in effect barring the combination of vowel length with abrupt cut. But that too may be incorrect. See the Appendix below.
- ⁵ A naked syllable is defined as one whose head is empty, a covered syllable as one that is not naked; see note 1 above.
- ⁶ As a matter of fact, the definition covers another variety of ambisyllabicity as well, that arising from extra-syllabicity, as for the medial *s* in German *stärkste*; cf. Vennemann 1994: section 4.5 for a detailed discussion.
- ⁷ The reason why a connection of the phonetic characterization of the speech sound (or its position) to the following crescendo is prohibited in the rule is that German final devoicing only operates in "free codas", not in "ambisyllabic codas": *Tag* /tāk/ 'day', *Rugby* /rāk.bi/, *egge* /ék.ta/ 'harrowed', but *eggen* /égp/ 'to harrow', *egge* /égə/ 'harrow'. Cf. Vennemann 1978: 178-180 and 1994: section 4.7 for detailed discussion of final devoicing in Standard German.
- ⁸ A survey and discussion of attempts at a phonetic explanation of these changes in terms of quantity may be found in Hubmayer 1983. All attempts have been unsuccessful. Hubmayer himself proposes that the clusters in question produce subphonemic lengthening of preceding short vowels in synchronic experiments. But he offers no explanation why such subphonemic lengthenings led to the alleged phonemic quantity changes in late Old English and in Middle English.
- ⁹ Minkova 1985, still cited as her view of the matter in Minkova 1991: 116, attempts to buttress her theory of a causal connection between so-called open syllable lengthening and the loss of final schwa by analysing it more explicitly in terms of foot structure. But the problem remains that even in terms of foot structure initially accented CVCV disyllables and CVC monosyllables are metrically equivalent in quantity languages.
- ¹⁰ All exceptions to the expected "lengthening" and "shortening" in German are discussed in detail by Reis 1974 – a book which has found surprisingly little attention by students of the same kinds of change in English.

- ¹¹ There is also interference in many words from paradigmatically related forms without syllable smoothing, owing to different syllable structure (closed syllables) or a greater number of syllables (trisyllabicity effects). Conversely, smooth cut is often analogically carried beyond its phonological domain. But these morphological disturbances do not obscure the original, phonologically motivated application of the change under consideration.
- ¹² This factor is also mentioned by Minkova (1982: 55, n. 10).
- ¹³ Very likely the proper formulation of this observation takes the form of a preference law: Complexities in the margins of a syllable are the less preferred the more consonant-like (the less sonorous) is the nucleus of the same syllable. If this sounds reasonable, historical lexicologists may want to check if there are indeed statistically the more exceptions to open syllable smoothing the higher up in the hierarchy of consonantal strength (i.e., in the series /r l n m/) is the nuclear consonant of the final syllable.
- ¹⁴ [Sievers 1901: 598] has pointed out that in Stage German [older name of Standard German] e.g. *Halm* too is pronounced with strongly cut accent [abrupt syllable cut]. But he stressed at the same time [1901: 595] that the differentiation between strongly and weakly cut accent [abrupt cut and smooth cut] which is valid for Stage German does not hold everywhere in German: A clear strongly cut accent is lacking in a variety of dialects, and even where it exists it is not applied in cases such as *Halm*, *halten*.
- ¹⁵ See note 4 above.

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