

# Low German: A profile of a word language – and why it matters

Steffen Höder, Universität Hamburg

## Structure

2

- Preliminaries
  - Modern Low German
  - Word vs. syllable languages
- Typological profile
  - Syllable structure
  - Syllable nuclei and stress
  - Word-medial consonants
  - Pitch accent
- Why it matters
  - Low German as non-standard German
  - Low German in an areal perspective

Low German: A profile of a word language – and why it matters

## 3 Preliminaries

Modern Low German  
Word vs. syllable languages

Low German: A profile of a word language – and why it matters

## Modern Low German (1)

4

- Overview based on
  - a synchronic analysis
  - an intralingual analysis
- For brevity's sake
  - Focus on unexpected features (from a Standard German perspective)
- Caveat: A lot could be said (but isn't) about
  - sentence intonation, sandhi phenomena, details in compound phonology, loanwords vs. core lexicon, multilectalism, effects of code-mixing (of whatever kind)

Low German: A profile of a word language – and why it matters

## Modern Low German (2)

5

- Exemplary analysis
  - North Low Saxon
  - Presumably representative for dialects in at least Hamburg and Schleswig-Holstein
- Based on a detailed survey of one dialect
  - Altenwerder (Höder in prep.)
  - compared with Finkenwerder (Kloeke 1913), Kirchwerder (von Essen 1958, 1964), traditional Hamburg urban variety (*Hafenplatt*, native dialect)

Low German: A profile of a word language – and why it matters

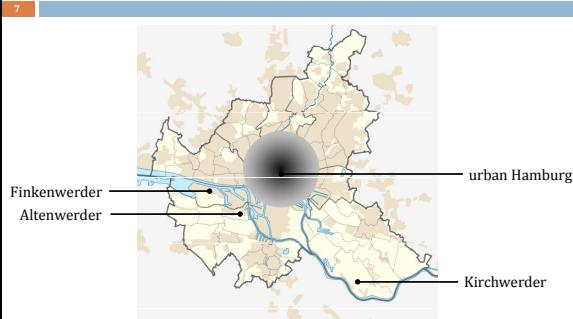
## Modern Low German (3)

6



Low German: A profile of a word language – and why it matters

## Modern Low German (4)



Low German: A profile of a word language – and why it matters

## Word vs. syllable languages

8

- Word vs. syllable as most prominent/relevant phonological unit
  - internal structure, phoneme inventories, suprasegmental features, scope of phonological rules/processes, boundary markers, diachronic development ...
- Selected criteria
  - proposed by Auer (2001), Szczepaniak (2007), Nübling et al. (2008)

Low German: A profile of a word language – and why it matters

## Word vs. syllable languages

9

	Prototypical syllabic language	Prototypical word language
Stress	phrase level	word level
Syllable structure	simple	complex
Vowel system	word-independent	word-sensitive
Phonological processes	uniform	differentiated (stress-sensitive)
Tone (if present)	syllable-related	word-related
Quantity (if present)	syllable-related	word-related
Geminates	uniform	stress-sensitive
	yes	no

Low German: A profile of a word language – and why it matters

## Typological profile

- 10
- Phoneme inventory
  - Syllable structure
  - Syllable nuclei and stress
  - Word-medial consonants
  - Pitch accent
  - Profile summary

Low German: A profile of a word language – and why it matters

## Phoneme inventory (1)

11

	labial	dental	palatal	velar	glottal
plosives [-voiced]	p	t		k	
plosives [+voiced]	b	d		g	
fricatives [-voiced]	f	s; ſ;	ʃ	x	h
fricatives [+voiced]	v	z	ʒ		
nasals	m	n		ŋ	
lateral		l			
vibrant		r			

Low German: A profile of a word language – and why it matters

## Phoneme inventory (2)

12

	front [-rounded]	front [+rounded]	back
close	i	y	u
near close	ɪ	ʏ	ʊ
close-mid	e	ø	o
open-mid	ɛ	œ	ɔ; ɔ:
open	a; a:		ɒ

	front	back
close-mid	eo	
open-mid	ɛɪ	ɔɪ
open	aʊ	ɑɪ

Low German: A profile of a word language – and why it matters

## Syllable structure (1)

13

- Possible syllables & words
  - *teq* 'too (much)' – *dvaax* 'dwarf'
- Impossible syllables & words
  - \**kmø* – \**srofp*
- Possible syllables, but impossible words
  - *gn* – *bl*
  - cf. *kriŋj* 'to get' – *'tsibl* 'onion'
- Possible words, but how many syllables?
  - *kom* 'to come' – *fñ* 'to find'

Low German: A profile of a word language – and why it matters

## Syllable structure (2)

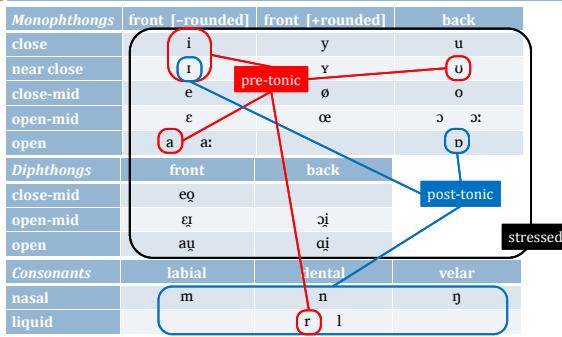
14

- Mainly = Standard German
- Word-initial clusters
  - *st̩em* 'stone' – *sprok* 'language' – *svat* 'black'
  - *smitn* 'to throw' – *snakj* 'to speak' – *slaj* 'snake'
  - *dvas* 'across' – *tv̩x* 'two'
  - *vrak* 'wreck' – *'vrøgl̩n* 'to nag, to niggle'
- Syllabic consonants
  - *'zupm* 'to drink' – *'zitn* 'to sit' – *'zegŋ* 'to say'
  - *'tsedl* 'sheet (of paper)' – *'votr* 'water'

Low German: A profile of a word language – and why it matters

## Syllable nuclei and stress

15



Low German: A profile of a word language – and why it matters

## Word-medial consonants (1)

16

- Word-medial flap [r]
  - Context: immediately after stressed vowel, not before nasals
  - Allophone of /d/ or /r/?
  - Evolved from & in complementary distribution with both
  - *'fa[r]r* 'father' – *eql'va:[r]r* 'Altenwerder (village)'
  - *'knɔ[r]ix* 'knobby (of a tree)' – *'le[r]ix* 'empty'

Low German: A profile of a word language – and why it matters

## Word-medial consonants (2)

17

- Word-medial long /s/
  - Context: immediately after stressed vowel
    - Evolved from & in complementary distribution with /st/
  - *'ves:n* 'west' – *'zyɔ:n* 'sister'
  - apparent contradiction: geminate?

Low German: A profile of a word language – and why it matters

## Word-medial consonants (3)

18

- Word-medial obstruent voicing
  - Optional process: /ptk/ > [bdg]
  - in some dialects obligatory (/bdg/)
  - Context: immediately after stressed vowel
    - (several restrictions, e.g. /p/ > [b] only after certain vowels)
  - *'kb[plb]m* 'to knock' – *'ri[tld]n* 'to tear, to rip'
  - *'dr[kgl]r* 'thicker'
- Optimal/preferred form for /VCV/ structures
  - = voiced C (word-based constraint?)
  - Intervocalic /fs/ are infrequent
  - Voiceless /x/ (and /ʃ/) without voiced counterpart

Low German: A profile of a word language – and why it matters

## Word-medial consonants (4)

19

□ The case of post-verbal *ik*

- *v̊l̊n* 'to want': *ik v̊l̊*    *v̊l̊ + ik → 'v̊lik'*  
*frobm* 'to scrub': *ik fr̊op*    *fr̊op + ik → 'fr̊obik'*
- *'lezn* 'to believe': *ik l̊es*    *l̊es + ik → 'lezik'*  
*'møg̊y* 'to like': *ik max*    *max + ik → 'maxik'*

□ Morphophonological alternation

- /b~p/, /z~s/, /g~x/, ...

Low German: A profile of a word language – and why it matters

## Word-medial consonants (5)

20

□ Syllable-based model

- Resyllabification at the word boundary



- Auslautverhärtung undone in the onset

- ... → 'fr̊obik'    ... → 'le.zik'

- But /g~x/ deviant from other obstruents

- \*ma.g̊ik    ... → 'ma.xik'

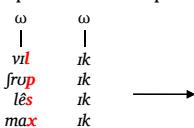
Low German: A profile of a word language – and why it matters

## Word-medial consonants (6)

21

□ Word-based model

- Expansion of the phonological word (→ clitic?)



- Word-medial obstruent voicing (→ optimal form)  
 ▫ \*'fr̊opik'    ... → 'fr̊obik'

Low German: A profile of a word language – and why it matters

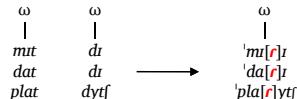
## Word-medial consonants (7)

22

□ Related phenomena

- Word-medial flap (→ optimal form)

- *mut* 'with' + *dr* 'the'  
*dat* 'that' + *di* 'the'  
*plat* 'flat' + *dylf* 'German'



Low German: A profile of a word language – and why it matters

## Pitch accent (1)

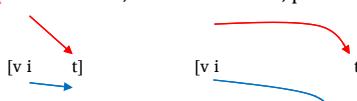
23

□ Suprasegmental feature

- *vit* 'wide, far' – *v̊it* 'willow'

□ Phonetic features

- **pitch** contour, vowel **duration**, possibly **intensity**



□ 'Uncontroversial' transcription: ^

Low German: A profile of a word language – and why it matters

## Pitch accent (2)

24

□ Distinctive feature: controversial issue

- Vowel quantity is distinctive

- Binary quantity: short vs. long vowels, besides qualitatively organised vowel system (Kohler 1986, 2001)
- Ternary vowel quantity: short vs. long vs. overlong vowels (von Essen 1958, 1964, Ternes 1981, Auer 1991, Chapman 1993)

- Pitch contour is distinctive

- Tonal distinction: toneme 1 vs. 2 ('Schleifton'), besides binary vowel quantity (Bremer 1927, Jakobson 1931, Ternes 2001, 2006, Prehn 2007)
- Tonal distinction: toneme 1 vs. 2, besides qualitatively organised vowel system (Höder in prep.)

Low German: A profile of a word language – and why it matters

## Pitch accent (3)

25

- Context
  - Once per phonological word
  - Final syllable (of certain types)
  - Variable position within the syllable
    - vocalic nucleus: *vit* 'wide, far' – *vît* 'willow'
    - word-final nasal: *kan* 'pot, jug' – *kañ* 'pots, jugs'
    - minimal triplet: *miñ* 'my' – *mîñ* 'mine (weapon)' – *miñ* 'mines'
- Pitch accent in compound formation
  - and in pseudo-compounds, ...

Low German: A profile of a word language – and why it matters

## Profile summary

26

	Prototypical syllable language	Prototypical word language
Stress	phrase level	word level
Syllable structure	simple	complex
Vowel system	word-independent	word-sensitive
Phonological processes	uniform	differentiated (stress-sensitive)
Tone (if present)	syllable-related	word-related (e.g. word-medial allophones)
Quantity (if present)	uniform	word-related
Geminates	yes	stress-sensitive
		no

Low German: A profile of a word language – and why it matters

27

## Why it matters

- LG as non-standard German
- LG in an areal perspective

Low German: A profile of a word language – and why it matters

## LG as non-standard German

28

- Non-standard data in cross-linguistic typology
  - important, but neglected! (Auer 1990, 2004)
  - cf. the 'Franconian' tone contrast (Gussenhoven 2000, Peters 2006, ...)
- Revealing about northern varieties of Standard German
  - *Missingsch*-type L2 varieties
  - Contemporary regional varieties (Northern High German, cf. Ternes' [1999] analysis)
  - North German 'accent' of Standard German
  - Variation within this spectrum (cf. Auer 1998)

Low German: A profile of a word language – and why it matters

## LG in an areal perspective (1)

29

- Transitional zone, high degree of contact
  - Danish
    - Differentiated, highly stress-sensitive vowel system (Grønnum 1998)
    - Word-medial obstruent voicing
    - Word-level suprasegmental phoneme (*stød*)
  - South Jutlandic
    - ... + pitch accent system (Ringgaard 1971, Ejskær 2005)

Low German: A profile of a word language – and why it matters

## LG in an areal perspective (2)

30

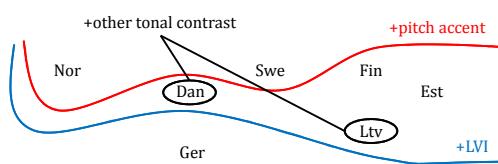
- Contact zone
  - Scandinavian languages
    - Relatively closely related subfamily
    - Historically intense contact between LG and Scandinavian, high degree of contact-induced convergence (morphology, syntax; Braumüller 2004)
    - Pitch accent system (Norwegian, Swedish)
  - Circum-Baltic languages
    - Areal group, different language families
    - Intense contacts (Koptjevskaja-Tamm & Wälchli 2001)
    - Phonological similarities (Eliasson 2000)

Low German: A profile of a word language – and why it matters

### LG in an areal perspective (3)

31

- Large vowel inventories and polytonicity: standard varieties (Höder forthc.)

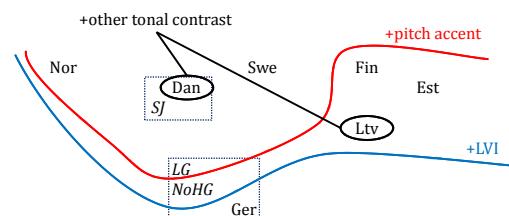


Low German: A profile of a word language – and why it matters

### LG in an areal perspective (4)

32

- Large vowel inventories and polytonicity: standard & non-standard varieties



Low German: A profile of a word language – and why it matters

33

### Conclusion

Low German: A profile of a word language – and why it matters

### Conclusion (1)

34

- A word language

- Perhaps more prototypical than Standard German
- More differentiated vowel system
- Highly stress-sensitive system of nuclei
- Slightly more complex word-initial clusters
- Phonological processes (word-medial consonants)
  - Resegmentation of words (rather than resyllabification)
- Pitch accent, i.e. word-based suprasegmental

Low German: A profile of a word language – and why it matters

### Conclusion (2)

35

- Relevant because ...

- LG may share features with other non-standard varieties/geographical dialects
- LG shares features with northern varieties of Standard German
- LG constitutes a transitional variety
  - Danish (non-standard varieties, again, included)
  - Scandinavian
  - Circum-Baltic

Low German: A profile of a word language – and why it matters

Thank you for your attention!

*sjîn dank eôk ført 'teôhçîrn*

Low German: A profile of a word language – and why it matters

## Examples

<b>Slide 13</b>	<i>to</i>	/teɔ/	[t <sup>h</sup> eɔ]	‘too (much)’
	<i>Dwarg</i>	/dva:x/	[dvɑ:x]	‘dwarf’
	<i>kriegen</i>	/'krɪgə/	[k <sup>h</sup> rɪgə]	‘to get’
	<i>Zibbel</i>	/'tsɪbl/	[t'sɪbl]	‘onion’
	<i>kamen</i>	/kɔ:m/	[k <sup>h</sup> ɔ:m:]	‘to come’
	<i>finnen</i>	/fi:n/	[fɪn:]	‘to find’
<b>Slide 14</b>	<i>Steen</i>	/steɪn/	[steɪn]	‘stone’
	<i>Spraak</i>	/sprok/	[sprɔk]	‘language’
	<i>swatt</i>	/svat/	[svat]	‘black’
	<i>smieten</i>	/'smi:tən/	[smi:tən]	‘to throw’
	<i>snacken</i>	/'snakən/	[snakən]	‘to speak’
	<i>Slang</i>	/slanŋ/	[slanŋ]	‘snake’
	<i>dwars</i>	/dva:s/	[dvɑ:s]	‘across’
	<i>twee</i>	/tvɛ:/	[t <sup>h</sup> vɛ:]	‘two’
	<i>Wrack</i>	/vrak/	[vræk]	‘wreck’
	<i>wrogeln</i>	/'vrøgl̩n/	[vrøgl̩n]	‘to nag, to niggle’
	<i>supen</i>	/'zupm/	[zupm]	‘to drink’
	<i>sitten</i>	/'zitn/	[zitn]	‘to sit’
	<i>seggen</i>	/'ze:gn/	[ze:gn]	‘to say’
	<i>Zeddel</i>	/'tsedl/	[tsedl]	‘sheet (of paper)’
	<i>Water</i>	/'votr/	[vɔ:tə]	‘water’
<b>Slide 16</b>	<i>Vadder</i>	/fa[f]r/	[fɑ:rə]	‘father’
	<i>Oolwarder</i>	/eo[l]va:[f]r/	[eo[l]vɑ:rə]	‘Altenwerder (village)’
	<i>knorrig</i>	/'knɔ:f]ix/	[k <sup>h</sup> nɔ:riç]	‘knobby (of a tree)’
	<i>leddig</i>	/'le[f]ix/	[le:riç]	‘empty’
<b>Slide 17</b>	<i>Westen</i>	/ves:n/	[ves:n]	‘west’
	<i>Sister</i>	/'zy:sɪr/	[zy:sə]	‘sister’
<b>Slide 18</b>	<i>kloppen</i>	/klɔpm/	[k <sup>h</sup> lɔp̩m], [k <sup>h</sup> lɔbm]	‘to knock’
	<i>rieten</i>	/'ritn/	[ritn], [ridn]	‘to tear, to rip’
	<i>dicker</i>	/'dikr/	[d̥ikə], [d̥igə]	‘thicker’
<b>Slide 19</b>	<i>wüllen</i>	/vŶln/	[vŶln]	‘to want’
	<i>ik will</i>	/ik vɪl/	[?ɪk vɪl]	‘I want’
	<i>will ik</i>	/'vilik/	[vɪlɪk]	(‘want I’)
	<i>schrubben</i>	/'ʃrubm/	[ʃrubm]	‘to scrub’
	<i>ik schrubb</i>	/ik ſrup/	[?ɪk ſrup]	‘I scrub’
	<i>schrubb ik</i>	/'ʃrubɪk/	[ʃrubɪk]	(‘scrub I’)
	<i>lesen</i>	/'lezn/	[lɛ:zn]	‘to read’
	<i>ik lees</i>	/ik lēs/	[?ɪk lē:s]	‘I read’
	<i>lees ik</i>	/'lezik/	[lɛ:zik]	(‘read I’)
	<i>mögen</i>	/'mø:g̩n/	[mø:g̩n]	‘to like’
	<i>ik mag</i>	/ik max/	[?ɪk max]	‘I like’
	<i>mag ik</i>	/'maxɪk/	[m̥axɪk]	(‘like I’)

<b>Slide 22</b>	<i>mit</i>	/mit/	[mɪt]	‘with’
	<i>de</i>	/dɪ/ <sup>1</sup>	[dɪ]	‘the’
	<i>dat</i>	/dat/	[dɑt]	‘that’
	<i>platt</i>	/plat/	[pʰlat]	‘flat’
	<i>düütsch</i>	/dytʃ/	[dytʃ]	‘German’
	<i>mit de</i>	/'mi[r]ɪ/	[ˈmɪrɪ]	‘with the’
	<i>dat de</i>	/'da[r]ɪ/	[ˈdɑrɪ]	‘that the’
	<i>plattdüütsch</i>	/'pla[r]ytʃ/	[ˈpʰlɑrɪtʃ]	‘Low German’
<b>Slide 23/25</b>	<i>wiet</i>	/vit/	[vit]	‘wide, far’
	<i>Wied</i>	/vît/	[vît]	‘willow’
<b>Slide 25</b>	<i>Kann</i>	/kan/	[kʰan]	‘pot, jug’
	<i>Kannen</i>	/kañ/	[kʰañ:]	‘pots, jugs’
	<i>mien</i>	/min/	[mi:n]	‘my’
	<i>Mien</i>	/mîn/	[mì:n]	‘mine (weapon)’
	<i>Mienen</i>	/miñ/	[mi:ñ:]	‘mines’

## References

- Auer, P. 1990. *Phonologie der Alltagssprache. Eine Untersuchung zur Standard/Dialekt-Variation am Beispiel der Konstanzer Stadtsprache*. Berlin: de Gruyter (Studia linguistica Germanica 28).
- Auer, P. 1991. “Zur More in der Phonologie”. *Zeitschrift für Sprachwissenschaft* 10, 3–36.
- Auer, P. 1998. “Hamburger Phonologie. Eine variationslinguistische Skizze der Stadtsprache der Hansestadt heute”. *Zeitschrift für Dialektologie und Linguistik* 65, 179–197.
- Auer, P. 2001. “Silben- und akzentzählende Sprachen”. In *Language typology and language universals. An international handbook*, Martin Haspelmath et al. (eds), vol. 2, Berlin: de Gruyter (Handbooks of linguistics and communication science 20.2), 1392–1399.
- Auer, P. 2004. “Non-standard evidence in syntactic typology. Methodological remarks on the use of dialect data vs spoken language data”. In *Dialectology meets typology. Dialect grammar from a cross-linguistic perspective*, B. Kortmann (eds), Berlin: Mouton de Gruyter (Trends in linguistics. Studies and monographs 153), 69–92.
- Braunmüller, Kurt. 2004. “Niederdeutsch und Hochdeutsch im Kontakt mit den skandinavischen Sprachen”. In *Deutsch im Kontakt mit germanischen Sprachen*, H. H. Munske (ed.), Tübingen: Niemeyer (Reihe Germanistische Linguistik; 248), 1–30.
- Bremer, O. 1927. “Der Schleifton im Nordniedersächsischen”. *Niederdeutsches Jahrbuch* 53, 1–32.
- Chapman, C. 1993. “Überlänge in North Saxon Low German: evidence for the metrical foot. An approach to vowel length based on the theory of metrical phonology”. *Zeitschrift für Dialektologie und Linguistik* 60, 129–157.
- Ejskjær, I. 2005. “Dialects and regional linguistic varieties in the 20th century III: Denmark”. In *The Nordic languages. An international handbook of the history of the North Germanic languages*, O. Bandle et al. (eds), vol. 2, Berlin: de Gruyter (Handbooks of linguistics and communication science 22.2), 1721–1741.
- Eliasson, S. 2000. “Typologiska och areallinguistiska aspekter på de nordeuropeiska språkens fonologi”. In *Språkkontakt. Innverknaden fra nedertysk på andre nordeuropeiske språk. Forskningsprogrammet Norden og Europa*, E. H. Jahr (ed.), Copenhagen: Nordisk Ministerråd (Nord 2000.19), 21–70.
- von Essen, O. 1958. “Die Vokale der niederdeutschen Mundart von Kirchwerder”. *Zeitschrift für Phonetik und allgemeine Sprachwissenschaft* 11, 105–118.
- von Essen, O. 1964. *Kirchwerder bei Hamburg*. Göttingen: Vandenhoeck & Ruprecht (Lautbibliothek der deutschen Mundarten 33/34).
- Grønnum, N. 1998. *Fonetik og fonologi. Almen og dansk*. Copenhagen: Akademisk forlag.
- Gussenhoven, C. & J. Peters. 2004. “A tonal analysis of Cologne Schärfung”. *Phonology* 21, 251–285.

1 strong form: /dɛɪ/

- Höder, S. forthc. "Dialect convergence across language boundaries: a challenge for areal linguistics". In *Studies in language variation. Proceedings from ICLaVE 5*, Frans Gregersen, Jeffrey Parrott & Pia Quist (eds), Amsterdam: Benjamins (Studies in language variation).
- Höder, S. in prep. "Das Lautsystem des Altenwerder Platt. Eine phonetisch-phonologische Bestandsaufnahme" [submitted: *Niederdeutsches Jahrbuch*].
- Jakobson, R. 1962 [1931]. "Über die phonologischen Sprachbünde". In *Selected writings*, vol. 1: *Phonological studies*, The Hague: Mouton, 137–143.
- Kloeke, G. 1913. *Der Vokalismus der Mundart von Finkenwärder bei Hamburg*. Hamburg: Gräfe & Sillem.
- Kohler, K. J. 1986. "Überlänge und Schleifton im Niederdeutschen. Zusammenfassung der Ergebnisse aus vier Dialektuntersuchungen". In *Phonetische Forschung in der niederdeutschen Dialektologie*, K. J. Kohler, R. Tödter & M. Weinhold (eds), Kiel: Universität Kiel, Institut für Phonetik (Arbeitsberichte des Instituts für Phonetik der Universität Kiel 23), 5–17.
- Kohler, K. J. 2001. "Überlänge im Niederdeutschen?". In *Vulpis Adolatio. Festschrift für Hubertus Menke zum 60. Geburtstag*, R. Peters, H. P. Pütz & U. Weber (eds), Heidelberg: Winter (Germanistische Bibliothek 11), 385–402.
- Koptjevskaja-Tamm, M. & B. Wälchli. 2001. "The Circum-Baltic languages. An areal-typological approach". In *The Circum-Baltic languages. Typology and contact*, Ö. Dahl & M. Koptjevskaja-Tamm (eds), vol. 2: *Grammar and typology*, Amsterdam: Benjamins (Studies in language companion series 55), 615–750.
- Nübling, D. et al. 2008. *Historische Sprachwissenschaft des Deutschen. Eine Einführung in die Prinzipien des Sprachwandels*. 2<sup>nd</sup> edn. Tübingen: Narr.
- Peters, J. 2006. "The dialect of Hasselt". *Journal of the International Phonetic Association* 36, 117–124.
- Prehn, M. 2007. "Schwa loss and its results in Low German. Tone or overlength?". *Linguistics in the Netherlands* 2007, 187–198.
- Ringgaard, K. 1973. *Danske dialekter. En kortfattet oversigt*. Copenhagen: Akademisk forlag.
- Szczepaniak, Renata. 2007. *Der phonologisch-typologische Wandel des Deutschen von einer Silben- zu einer Wortsprache*. Berlin: de Gruyter (Studia linguistica Germanica 85).
- Ternes, E. 1981. "Über Herkunft und Verbreitung der Überlänge in deutschen Dialekten". In *Phonologica 1980. Akten der Vierten Phonologie-Tagung. Wien, 29. Juni – 2. Juli 1980*, W. U. Dressler, O. E. Pfeiffer & J. R. Rennison (eds), Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck (Innsbrucker Beiträge zur Sprachwissenschaft 36), 379–386.
- Ternes, E. 1999. *Einführung in die Phonologie*. 2<sup>nd</sup> edn. Darmstadt: Wissenschaftliche Buchgesellschaft.
- Ternes, E. 2001. "Ansätze zu einer Phonemtypologie deutscher Dialekte". In *Gesprochene Sprache – transdisziplinär. Festschrift zum 65. Geburtstag von Gottfried Meinhold*, M. Bräunlich, B. Neuber & B. Rues (eds), Frankfurt: Lang (Hallesche Schriften zur Sprechwissenschaft und Phonetik 5), 171–182.
- Ternes, E. 2006. "Tone reversal in Franconian and elsewhere". *North-Western European language evolution* 48, 91–109.