Factorial typology and language change

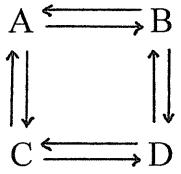
Ricardo Bermúdez-Otero
University of Manchester / Universidad de Santiago de Compostela

OVERVIEW

I. TWO MODELS OF LANGUAGE CHANGE

(1) **The framework of comparison: the grammar lattice**
(see Greenberg 1978, 1995; Anttila & Cho 1997)

	*CODA » FAITH	FAITH » *CODA
ONSET » FAITH	CV (System A)	CV, CVC (System B)
FAITH » ONSET	CV, V (System C)	CV, CVC, V, VC (System D)



• *Nodes* = Set of permissible grammatical states
(defined by a finite number of cross-cutting typological dimensions).
• *Arrows* = Set of permissible transitions between grammatical states
The history of a language consists of a series of transitions.
• Specific transitions are characterized by a probability index.

(2) **Language change as a Random Walk**

> [...T]here is no more reason for languages to change than there is for automobiles to add fins one year and remove them the next, for jackets to have three buttons one year and two the next, etc. That is, it seems evident within the framework of sound change as grammar change that the 'causes' of sound change without language contact lie in the general tendency of human cultural products to undergo 'nonfunctional' stylistic change. (Postal 1968: 283)

• The selection of linguistic variants is exclusively determined by social factors.
• All available transitions between permissible states are equally probable.

(3) *Random Walk Hypothesis*
The diachronic trajectory of a linguistic system is equivalent to a random walk in the grammar lattice.

(4) **Language change as a Game of Chess**

> [...D]e même qu'au jeu d'échecs la perte d'une pièce provoque souvent toute une série de déplacements de la part du joueur menacé en vue de rétablir l'équilibre, de même, dans une langue donnée, on a besoin de toute une série d'innovations visant à redonner au système phonologique sa stabilité et son équilibre.
> (Jakobson 1929[1962]: 18)

• The selection of linguistic variants is partly determined by intralinguistic factors (e.g. architecture of the grammar, production/perception mechanisms).
• Transitions between states have inherently weighted probabilities; hence, diachronic trajectories are non-random.

(5) **Diachronic evidence against the Random Walk Hypothesis (Lass 1987)**
• *Conspiracy*. A long-term sequence of changes appearing to be directed to a common goal: e.g. changes resulting in the neutralization of vowel length distinctions in the history of English, but see Bermúdez-Otero (1997).
• *Centre of gravity*. A preferred grammatical state to which a language continually returns: e.g. recurrence of [æ] in the history of Southern British English since Germanic.
• *Convergent drift*. Parallel innovation in genetically-related but non-contacting languages: e.g. Prokosch's Law in Germanic (see III to V below).

II. SYNCHRONIC TYPOLOGY AND HISTORY

(6) **Implicational universals and Trigger-Chain models of language change**

Jakobson's (1929) 'Trigger-Chain' scenario:
• Implicational universal: P→Q
• Diachronic chain: -P&-Q > **P&-Q > P&Q**

Trigger-Chain scenarios are logically inconsistent (Hawkins 1979, 1983, 1990):

(7) • If P→Q is an absolute universal, then change will never create a *P&-Q system in the first place (Uniformitarian Principle).
• Transition from -P&-Q to P&Q may follow paths (a) and (b), but not (c):

(a) -P&-Q > P&Q
(b) -P&-Q > -P&Q > P&Q
*(c) -P&-Q > P&-Q > P&Q

Yet this constraint is trivially compatible with the Random Walk Hypothesis.

(8) • If P→Q is a mere statistical tendency, then the unstable system P&-Q may indeed arise.
• -P&-Q > P&-Q violates -Q→P (the contrapositive of P→Q).

(9) **Distributional universals and the Relative Time Hypothesis (Hawkins 1983, 1990)**

> *Relative Time Hypothesis*
> The historical stability of a grammatical type is directly proportional to its synchronic frequency, as predicted by 'distributional universals'.

• Distributional asymmetry: SOV&Postp =93% *vs.* SOV&Prep =7%
• Diachronic prediction: SOV&Prep is unstable
• Empirical evidence: elimination of SOV&Prep in 5 IE families: Baltic, Slavic, Greek, Romance, Germanic (except German).

(10) Frequency ≠ stability (Lass 1975)
'Family universals': Segment types with restricted distribution but high stability.
E.g. retroflex stops in the Indian subcontinent, clicks in Southern Africa.

(11) **Frequency and geographical scattering as historically emergent typological features** (Greenberg 1978: 75-6, 1995: 151-2)

• *Scattering*: probability that any pair of T-type languages will belong in different genetic or areal groups, e.g. high scattering: vowel nasalization
low scattering: lexical tone

• Greenberg's proposal: frequency and scattering are diachronically emergent typological features, arising from the dynamics of language change
—*incidence*: probability of ingress into type T, i.e. p(-T>T).
—*stability*: probability of non-egress from type T, i.e. 1-p(T>-T)
High incidence + low stability → high scattering
Low incidence + high stability → low scattering.

(12) **Summary**

• In some empirical cases, the evidence of history dovetails with that of synchronic typology: e.g. shift away from SOV&Prep in IE (see 9 above).
Ideally, a (functional) explanation can then be specified: e.g. parsing preference for rapid attachment of constituents to their mother nodes (Hawkins 1990).

• However, there is no reliable theoretical principle allowing one to derive constraints on the direction of language change from synchronic distributional evidence.

• Allegations of non-random diachronic development have to be judged on their own merits.

III. CONVERGENT DRIFT IN GERMANIC: THE CLAIM

(13) **'Prokosch's Law'**

> The Germanic stress accent led to the weakening or loss of unstressed syllables [...] A continuation of this effect is seen in a **standardization of the quantity** of accented syllables that took place in all Germanic languages during the 13th and 14th centuries. The details differ considerably in the several languages, but the principle is the same everywhere: **short accented vowels in open syllables are lengthened.** (Prokosch 1938: 140)

See also Árnason (1980), Lahiri (1995), Lass (1974, 1987, 1992), Murray & Vennemann (1983), Riad (1992), Vennemann (1988).

PKPROM: If a syllable is stressed, then it is bimoric.

(14) **Why suspect Prokosch's Law?**
- Flaws in traditional handbook reconstruction:
e.g. Middle English Open Syllable Lengthening (MEOSL) is a misnomer for a compensatory lengthening process (Minkova 1982, Bermúdez-Otero 1997)
- Focus on standard languages, at the expense of dialectal evidence:
e.g. High Alemannic, Scandinavian 'balance' dialects, etc.

(15) **Empirical problems**
- Contact between dialects
- Influence of the standard national languages (e.g. German *Hochsprache*)
- PKPROM was already active in Proto-Gmc: e.g. Sievers's Law in Gothic (Riad 1992)

		ONSET	PKPROM	*CODA	*COMPLX
/sookIIs/ *'you seek'*	soo.kiis ☜				
	sook.iis	*!		*	
	sook.jis			*!	
	soo.kjis				*!
/nasIIs/ *'you save'*	na.siis		*!		
	nas.iis	*!		*	
	nas.jis ☜			*	
	na.sjis		*!		*

(16) **Evaluation**
- The claim of convergent drift is hard to verify (15).
- Typological analysis may falsify it (IV and V).

IV. A FACTORIAL TYPOLOGY OF QUANTITY ADJUSTMENTS

(17) **The North-West Germanic inheritance**
- Fixed root-initial non-iterative trochaic stress: ALL-FT-L » PARSE$^{\sigma}$.
  [The evidence of secondary stress in Old English, Old Icelandic and Old High German is difficult to interpret, and does not affect the matter at hand.]
- Strict ban on monomoric lexical items: FTBIN, LX≈PR » DEP$^{\mu}$.
- Vowel shortening in unstressed (=non-root) syllables: MAX^{Seg} » WSP » MAX$^{\mu}$.
  [Preliterary Old English, Proto-Nordic, but later in Old High German.]

(18) **Sharpening the focus**
I disregard the following phenomena:
- compensatory lengthening, which does not affect mora-count;
- closed syllable shortening and other processes where stress does not play a rôle;
- sensitivity to structure below the root node (e.g. vowel lengthening hierarchy *low* > *mid* > *high*).

(19) **The constraints**
- PKPROM (Prince & Smolensky 1993: 39): If a syllable is stressed, then it is bimoric.
- RHHRM (Prince & Smolensky 1993: 59): Unbalanced trochees (HL) are forbidden.
- WEAKEDGE (Spaelti 1994)
  - WEAKC: Word-final consonants are not syllabified.
  - NONFIN: Word-final syllables are not footed.
- PARSE^{Seg} (Prince & Smolensky 1993: 85): All segments are syllabified.
- PARSE$^{\sigma}$ (Prince & Smolensky 1993: 61): All syllables are footed.
- DEP$^{\mu}$ (McCarthy & Prince 1995): Every output mora has an input correspondent.
- MAX$^{\mu}$ (McCarthy & Prince 1995): Every input mora has an output correspondent.

(20) **The rankings (I): lengthening**

Lengthening in -VC Monosyllables (VCMonL)
WEAKC » PARSE^{Seg}, DEP$^{\mu}$

/CVC/	FTBIN	WEAKC	PARSE^{Seg}	DEP$^{\mu}$
$_{\sigma}$(CV)$_{\sigma}$C	*!		*	
$_{\sigma}$(CVC)$_{\sigma}$		*!		
☞ $_{\sigma}$(CVV)$_{\sigma}$C			*	*

(21) *General Open Syllable Lengthening* (GenOSL)
PKPROM » DEP$^{\mu}$

(22) *Open Penult Lengthening* (OPenL)
NONFIN » PARSE$^{\sigma}$, DEP$^{\mu}$ » PKPROM

/Lσ/	FTBIN	NONFIN	PARSE$^{\sigma}$	DEP$^{\mu}$
$_{Ft}$(L)$_{Ft}$σ	*!		*	
$_{Ft}$(Lσ)$_{Ft}$		*!		
☞ $_{Ft}$(+L)$_{Ft}$σ			*	*

Note: +L = underlying L surfacing as H

(23) **The rankings (II): shortening**

General Trochaic Shortening (GenTrochS)
RHHRM, PARSE$^{\sigma}$ » MAX$^{\mu}$, NONFIN

/HL/	RHHRM	PARSE$^{\sigma}$	MAX$^{\mu}$	NONFIN
$_{Ft}$(HL)$_{Ft}$	*!			*
$_{Ft}$(H)$_{Ft}$L		*!		
☞ $_{Ft}$(-HL)$_{Ft}$			*	*

Note: -H = underlying H surfacing as L

(24) *Trisyllabic Shortening* (TSS)
RHHRM, NONFIN » PARSE$^{\sigma}$ » MAX$^{\mu}$

		RHHRM	NONFIN	PARSE$^{\sigma}$	MAX$^{\mu}$
/HL/	(HL)$_{Ft}$	*!	*!		
	☞ (H)$_{Ft}$L			*	
	(H^{-}L)$_{Ft}$		*!		*
/HLL/	(HL)$_{Ft}$L	*!		σ	
	(H)$_{Ft}$LL			σσ!	
	☞ (-HL)$_{Ft}$ L			σ	*

(25) **Implications**

PKPROM is *not* a crucial participant in either Open Penult Lengthening or Lengthening in -VC Monosyllables. These lengthening processes are structurally and logically independent from General Open Syllable Lengthening.

V. CONVERGENT DRIFT IN GERMANIC? THE FACTS

(26) **Monosyllables vs. polysyllables**

		OSL	
		✗	✓
VCMonL	✗	English Nord-Gudbrandsdalen Thurgau, Schaffhausen	Danish Dutch Low German
	✓	High Alemannic dialects Scandinavian 'balance' dialects	Icelandic Std. Swedish & Norwegian Central Bavarian

Examples (morphologically related words with etymologically short root-vowels):

(27) • Canton Thurgau (High Alemannic, Switzerland):

gras	*grasə*	'grass'/'to graze'	
grab	*grebər*	'grave' (sg/pl)	(Handschuh *et al.* 1965).

(28) • Glarnertüütsch, Canton Glarus (High Alemannic, Switzerland):

haas	*hasə*	'rabbit' (sg/pl)	
graab	*grebər*	'grave' (sg/pl)	(Spaelti 1994).

• Älvdalen (a 'balance' dialect of Swedish):

daal	*dalir*	'valley' (sg/pl)	
smiið	*smiðir*	'blacksmith' (sg/pl)	(Riad 1992).

(29) • Danish:

fred	*freeden*	'peace' (indef/def)	
gud	*guuden*	'god' (indef/def)	(Hansen 1962).

• Dutch:

schip	*scheepen*	'ship' (sg/pl)
dak	*daaken*	'roof' (sg/pl).

(30) • Swedish:

veet	*veeta*	'wit'/'to know'	
vääv	*vääva*	'weave'/'to weave'	
stiig	*stiiga*	'path'/'to step'	(Riad 1992).

(31) **East Upper German dialects: Penult Lengthening + Trisyllabic Shortening**

• Sieben Gemeinden German (Kranzmayer 1925, 1935):

Etymologically short root-vowels:			Etymologically long root-vowels:		
OPenL	—		—	TSS	
naˈgel (sg.)	*negəle* (pl.)	'nail'	*ādərn* (pl.)	*adɒra* (sg.)	'vein'
vaˈtər (nom.)	*vatərə* (dat.)	'father'	*ātom* (n.)	*atɒman* (vb.)	'breath(e)'
vęˈdern (pl.)	*vędɒra* (sg.)	'feather'		*lęwərxa*	'lark'
waˈgen (sg.)	*węgəne* (pl.)	'wain'	*mūtər* (sg.)	*mutərə* (pl.)	'mother'

[The original transcription has been retained]

• According to Kranzmayer (1935), this pattern was once fully productive in a large group of East Upper German dialects. Subsequent developments, notably syncope, have considerably obscured its effects.

(32) **General Trochaic Shortening**

• Zürich Oberland; Rigi area and Amt Entlebuch (Canton Lucerne)
Words with etymologically short root-vowels display the length alternation characteristic of the main High Alemannic area: *graab / grebər*, see (28).
The pattern has been irregularly extended to items with etymologically long vowels:
e.g. Zürich Oberland (Weber 1923: 86)

moos	*mosə*	(OHG *mâsa*)	'speck of dirt' (sg/pl)
ʃtuud	*ʃtudə*	(OHG *stûda*)	'shrub' (sg/pl)
xrɪɪd	*xrɪdə*	(OHG *krîda*)	'chalk' (sg/pl)

For the Rigi area and the Amt Entlebuch, see Fischer (1960: 34), Schmid (1915: 120).

(33) • Middle English
Shortening has affected well over a third of surviving OE long-vowelled disyllables:
e.g. *cīcen* > *chicken*
dēofol > *devil*
sārig > *sorry*
Traditional account (Luick 1964: §387): analogical levelling from inflected forms subject to TSS, e.g. pl. *cīcenu* > *cicene*, whence *chicken.*
Problems: (i) no independent evidence of regular TSS in the native vocabulary (Minkova & Stockwell 1996)
(ii) inadequacy of analogical accounts in related cases: e.g. the notorious 'exceptions to MEOSL' (Bermúdez-Otero 1997, in prep.).

(34) **Summary**
• The Germanic languages display the full (or near-full) range of lengthenings and shortenings predicted by factorial typology.
• No significant correlations between processes can be observed: see e.g. (26).
• There is therefore insufficient evidence for the claim of convergent drift as made in the literature: see (13).

VI. CONCLUSION

• Current proposals of a link between synchronic typological distribution and diachrony (e.g. Hawkins's) are only partially successful: synchronic frequency ≠ diachronic stability.

• There is at present no general paradigm capable of explaining apparently non-random diachronic trajectories.

• Typology remains an indispensable tool for assessing claims of non-random diachronic developments (e.g. convergent drift).

• The assumption of convergent drift embodied in 'Prokosch's Law' underestimates the typological diversity of quantity adjustments in the Germanic languages.

REFERENCES

Anttila, A. & Y.-m. Y. Cho (1997). Variation and change in Optimality Theory. Ms., Stanford University, http://www-linguistics.stanford.edu/Linguistics/papers. (To appear in *Lingua*).

Árnason, K. (1980). *Quantity in historical phonology: Icelandic and related cases*. Cambridge: Cambridge University Press.

Bermúdez-Otero, R. (1997). Prosodic optimisation: the Middle English length adjustment. Ms., University of Manchester.

Bermúdez-Otero, R. (in preparation). Lexicon optimisation and lexical diffusion: irregular vowel length changes in Middle English. Ms., University of Manchester.

Enderlin, F. (no date). *Die Mundart von Kesswil im Oberthurgau.* (Beiträge zur schweizerdeutschen Grammatik **5**). Frauenfeld: Huber & Co.

Fischer, L. (1960). *Luzerndeutsche Grammatik: ein Wegweiser zur guten Mundart.* Zürich: Schweizer Spiegel Verlag.

Greenberg, J. H. (1978). Diachrony, synchrony, and language universals. In Greenberg, J. H. (ed.) *Universals of human language.* (4 vols.) Stanford: Stanford University Press. Vol 1: 61-91.

Greenberg, J. H. (1995). The diachronic typological approach to language. In Shibatani, M & T. Bynon (eds.) *Approaches to language typology*. Oxford: Clarendon Press. 145-166.

Handschuh, D., R. Hotzenköcherle & R. Trüb (eds) (1965). *Sprachatlas der deutschen Schweiz.* Vol. II: *Lautgeographie: Vokalquantität, Konsonantismus.* Bern: Francke Verlag.

Hansen, A. (1962). *Den lydlige udvikling i dansk, fra ca. 1300 til nutiden. 1, vokalismen.* Copenhagen: CEC Gads forlag.

Hawkins, J. A. (1979). Implicational universals as predictors of word order change. *Language* **55**: 618-648.

Hawkins, J. A. (1983). *Word order universals*. New York: Academic Press.

Hawkins, J. A. (1990). Seeking motives for change in typological variation. In Croft, W., K. Denning & S. Kemmer (eds.). *Studies in typology and diachrony. Papers presented to*

Joseph H. Greenberg on his 75th birthday. Amsterdam/Philadelphia: John Benjamins. 93-128.

Hawkins, J. A. (1991). Language universals in relation to acquisition and change: a tribute to Roman Jakobson. In Waugh, L. R. & S. Rudy (eds). *New vistas in grammar: invariance and variation.* Amsterdam: Benjamins. 473-493.

Hotzenköcherle, R. (1986). Aspekte und Probleme der Vokalquatität in Schweizerdeutschen. In Hotzenköcherle, R. *Dialektstrukturen im Wandel: Gesammelte Aufsätze zur Dialektologie der deutschen Schweiz und der Walsergebiete Oberitaliens.* (ed. by R. Schläpfer & R. Trüb). 319-333. Aarau: Verlag Sauerländer.

Jakobson, R. (1929). Remarques sur l'évolution phonologique du russe. *Travaux du Cercle Linguistique de Prague* **2**. Reprinted (1962) in *Selected writings*. Vol. I: *Phonological studies*. The Hague: Mouton & Co. 7-116.

Kranzmayer, E (1925). *Laut- und Flexionslehre der deutschen zimbrischen Mundarten, das sind die Mundarten in den sieben Vicentinischen Gemeinden, den dreizehn Veroneser Gemeinden und den deutschen Orten in Trentinischen (mit Ausnahme des Fersentales und des Nonsberges)*. Dissertation, University of Vienna. Published (1981) by M. Hornung (ed.) (Beiträge zur Sprachinselforschung **1**). Wien: Verband der wissenschaftlichen Gesellschaften Österreichs.

Kranzmayer, E. (1935). Lautliche Sonderwege alter Dreisilber im Ostoberdeutschen. *Zeitschrift für Mundartforschung* **11**: 65-131.

Lahiri, A. (1995). Pervasion, simplification and optimization in language change. Paper presented at the XII International Conference on Historical Linguistics, Manchester, 15 August 1995.

Lass, R. (1974). Linguistic orthogenesis? Scots vowel quantity and the English length conspiracy. In Anderson, J. M. & C. Jones (eds.) *Historical linguistics: Proceedings of the First International Conference on Historical Linguistcs, Edinburgh, 2-7 September 1973*. Amsterdam: North-Holland. Vol II: 311-352.

Lass, R. (1975). How intrinsic is content? Markedness, sound change, and 'family universals'. In Goyvaerts, D. L. & G. K. Pullum (eds.) *Essays on the sound pattern of English.* Ghent: E. Story-Scientia P.V.B.A. 475-504.

Lass, R. (1977). Centers of gravity in linguistic evolution. *Die Sprache* **23**: 11-19.

Lass, R. (1987). Language, speakers, history and drift. In Koopman, W. F., R. Lass, O. Fischer & R. Eaton (eds.) *Explanation and linguistic change*. Amsterdam: Benjamins. 151-176.

Lass, R. (1992). Phonology and morphology. In N. Blake (ed). *The Cambridge history of the English language*. Vol. II: *1066-1476*. Cambridge: Cambridge University Press. 23-155.

Luick, K. (1964 [1914-1940]). *Historische Grammatik der englischen Sprache.* Stuttgart: Bernhard Tauchnitz / Oxford: Basil Blackwell.

Minkova, D. (1982). The environment for Open Syllable Lengthening in Middle English. *Folia Linguistica Historica* **3**: 29-58

Minkova, D. & R. P. Stockwell (1996). The origins of long-short allomorphy in English. Paper presented at the IX International Conference on English Historical Linguistics, Poznań, 26 August 1996.

McCarthy, J. & A. Prince (1995). Faithfulness and reduplicative identity. In Beckman, J. N., L. W. Dickey & S. Urbanczyk (eds.) *Papers in Optimality Theory.* (University of Massachusetts Occasional Papers 18). Amherst: Graduate Linguistic Student

Association. 249-384. (ROA-60, Rutgers Optimality Archive, http://ruccs.rutgers.edu/roa.html).
Murray, R. W. & T. Vennemann (1983). Sound change and syllable structure in Germanic phonology. *Language* **59**: 514-528.
Postal, P. M. (1968). *Aspects of phonological theory.* New York: Harper & Row.
Prince, A. & P. Smolensky (1993). *Optimality Theory: Constraint interaction in generative grammar.* Ms., Rutgers University Center for Cognitive Science Technical Report #2.
Prokosch, E. (1938). *A comparative Germanic grammar.* Baltimore: Linguistic Society of America.
Riad, T. (1992). *Structures in Germanic prosody: A diachronic study with special reference to the Nordic languages.* Stockholm: Department of Scandinavian languages, Stockholm University.
Ritzert, A. (1898). Die Dehnung der mhd. kurzen Stammsilbenvokale in den Volksmundarten des hochdeutschen Sprachgebietes auf Grund der vorhandenen Dialektliteratur. *Beiträge zur Geschichte der deutschen Sprache und Literatur* **23**. 131-222.
Schmid, K. (1915). *Die Mundart des Amtes Entlebuch im Kanton Luzern.* (Beiträge zur schweizerdeutschen Grammatik 7). Frauenfeld: Huber & Co.
Spaelti, P. (1994). Weak edges and final geminates in Swiss German. *Papers from the Annual Meeting of the North East Linguistic Society* **24**: 573-588. (ROA-18, Rutgers Optimality Archive, http://ruccs.rutgers.edu/roa.html).
Vennemann, T. (1988). *Preference laws for syllable structure and the explanation of sound change, with special reference to German, Germanic, Italian and Latin.* Berlin: Mouton de Gruyter.
Weber, A. (1923). *Die Mundart des Zürcher Oberlandes.* (Beiträge zur schweizerdeutschen Grammatik **15**). Frauenfeld: Huber & Co.

Ricardo Bermúdez-Otero
Dept. of English and American Studies
University of Manchester
Oxford Rd.
Manchester M13 9PL

R.Bermudez-Otero@stud.man.ac.uk