Metrical Incoherence: different metrical structure at different strata

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1   Introduction

> **Claim: Metrical incoherence (different phonological processes refer to different assignments of metrical structure) is predicted in Stratal Optimality Theory. Metrical structure assigned at an earlier stratum can be overwritten or preserved by the reranked constraint system at a later stratum.**

Today:

- introduction to metrical incoherence: the overwriting type

- metrical incoherence is predicted in Stratal OT and generalizes to "different stress systems at different strata": in Stratal OT, there is no principled difference between stress that is unexpectedly overwritten vs. unexpectedly preserved - both result from reranking

- Washo: the preserving type

- incoherence with and without strata

2   A sketch of metrical incoherence in Tübatulabal

- metrical incoherence is characterized by two or more diagnostics for metrical structure in disagreement (see Dresher & Lahiri 1991, Vaysman 2009, Gordon 2016, Bennett 2013a,b compare also Hyman 2006)

- "normal" interaction of stress and phonological processes: lengthen stressed vowels, strengthen onsets of stressed syllables etc., often analyzed in reference to foot structure

- Tübatulabal (recently extinct, Uto-Aztecan) has a rhythmic process of lengthening which affects odd-numbered vowels in open syllables counting from the left, except if the vowel is word-final (examples from Bennett 2013a, Hayes 1995 with slight modifications in transcription, every example checked with the original source, usually Voegelin 1935)

(1)   Tübatulabal Rhythmic Lengthening
    a.   ta:.wɨ.gi:.na.na:.la   "to go along causing him to see"
    b.   ʔa:.da.wɨ:.gi.na:.na.la   "he went along causing him to see"
    c.   tɨk.ka.ma:.la   "let us eat"
    d.   tɨk.ka.la:.ma.la   "let us go eat"
    e.   tɨk.ki.lo:.go.ma:.la   "let us go and pretend to eat"

- lengthening is blocked if an immediately adjacent vowel is long underlyingly

(2)   /pihi:niwatt/ → [pihi:niwatt] "it is breaking (when he pulls it)"

- rhythmic length alternations are usually associated with stress

- indeed, every long vowel bears stress in Tübatulabal. However, so does the final vowel and every odd-numbered short vowel counting from **right to left** from the final vowel and starting again at a medial long vowel.

(3)   Tübatulabal stress

a.   (tɨ́k.ka)(má:)(lá)   "let us eat"
b.   (nó:)(ʔát.tsiŋ)(wán)   "his partner in turning back"
c. (tɨ́k.ka)(ná:)(lápu)(wát)   "he seems to be going along feeding him."

- an observation (cf. Bennett 2013a): lengthening feeds stress assignment

- expected if lengthening precedes stress assignment derivationally, but how can a rhythmic process precede stress assignment?

- unwilling to adopt left-to-right footing at any stage of the derivation for theory-internal reasons, Bennett (2013a) calls the productive, phonological nature of rhythmic lengthening into question on

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the basis of some examples of over- and underapplication and instead assumes stem-suppletion for every alternating stem as well as both prosodically and lexically conditioned allomorphy for the alternating affixes

- the amount of allomorphy (almost every morpheme has a long and a short variant) in this system is worrisome. Let's go back to a phonological solution:

- in Stratal Optimality Theory (Kiparsky 2000, 2015b, Bermúdez-Otero 2018), we could assume two strata, interfacing serially, such that

    1. on Stratum 1: Stress is assigned in trochees from left to right. Short vowels in foot heads are lengthened.

    2. on Stratum 2: Stress is assigned to the final syllable and in quantity-sensitive trochees from right to left[1].

- NONFINALITY: assign * for a stressed syllable that is final in PrWd

- *CLASH: assign * for a stressed syllable that is immediately followed by another stressed syllable

- SWP: assign * for a stressed syllable that is not heavy[2]

- FTBIN: assign * for a foot that is not binary at the moraic or syllabic level

- TROCHEE: assign * for a foot that is not left-headed

- PARSE-σ: assign * for a syllable that is not footed

- ALL-FT-LEFT: assign * for every syllable intervening between the left boundary of a foot and the left edge of PrWd

- DEP-μ: assign * for a mora in the output that does not have a correspondent in the input

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[1]Trochees following Kager (1989) and Hayes (1995), see also Prince's (1983) no-feet-analysis and Crowhurst's (1991) iambic analysis (both are crucially also right-to-left systems).

[2]To simplify matters, we will only consider candidates that satisfy SWP by lengthening.

(4)   Trochees and rhythmic lengthening at Stratum 1 (even number of syllables):

/tik.ka.ma.la/	NONFIN	*CLASH	SWP	FTBIN	TR	PARSE-σ	ALL-FT-L	DEP-μ
☞ a. (tík.ka)(máː.la)							**	*
b. (tík.ka)(má.la)			*!				**	
c. (tík.ka)ma.la						*!*		

- (b) fails to lengthen the stressed vowel, violating SWP, (c) fails to build a foot over the last two syllables, violating PARSE-σ

(5)   Trochees and rhythmic lengthening at Stratum 1 (odd number of syllables):

/tik.ka.la.ma.la/	NONFIN	*CLASH	SWP	FTBIN	TR	PARSE-σ	ALL-FT-L	DEP-μ
☞ a. (tík.ka)(láː.ma)la						*	**	*
b. (tík.ka)(láːma)(láː)	*!							**
c. (tík.ka)la(máː.la)						*	***!	*

- (b) parses the final syllable, violating NONFINALITY, (c) fails to align all feet as far to the left as possible under maximal parsing and therefore stresses and lengthens the wrong vowel

- *CLASH disallows foot heads to be adjacent to underlyingly long vowels

- moving on to the next stratum

- ALIGN-HD: assign * for every syllable that intervenes between the head of the head foot and the right edge of PrWd (Note: this constraint allows a top-down stress system that fixes main stress on the final syllable irrespective of weight-sensitivity and foot type, compare Hayes 1995)

- WSP: assign * for a heavy syllable that is not stressed

(6)   Stress on stratum 2 overwrites stratum 1[3]:

/(tík.ka)(máː.la)/	ALIGN-HD	WSP	TROCHEE	PARSE-σ	ALL-FT-R	*CLASH
☞ a. (tík.ka)(máː)(lá)					***	*
b. (tík.ka)(máː.la)	*!				**	
c. (tik.ká)(máː)(lá)			*!		***	**

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[3] A further crucial reranking involves promoting DEP-μ over SWP to prevent further lengthening.

- (b) shows that the faithful candidate fails to stress the final syllable, (c) demonstrates that an iambic parse yields the wrong result next to long vowels

- reranking involves crucial demotion of *CLASH and promotion of ALL-FT-R over ALL-FT-L as well as promotion of ALIGN-HD and DEP-μ

- in Stratal OT, systems like the one in Tübatulabal, with left-to-right footing on one stratum and right-to-left footing on the next, subject to potentially different requirements, are not unexpected (this fact informs a critical view of the framework in Wolf 2012)

- the discussion of whether or not stress assignment is best described as **cyclic** has been crucial in distinguishing cyclic and non-cyclic theories of phonology for a long time

- the Tübatulabal facts make a different point: the two cycles of stress assignment crucially follow **distinct constraint rankings**

- in derivational approaches, there are usually built-in constraints on stress systems "changing their mind" as the derivation moves along, perhaps most notably the Free Element Condition (Kiparsky 1982, Halle 1990, Halle & Kenstowicz 1991)

- footing reversal is not predicted in Harmonic Serialism (see Wolf 2012, Pruitt 2010)

- In Stratal OT, an old question makes a comeback: if stress systems can undergo reranking, how different can they be within one language? For example: Does Stratal OT predict languages with lexical-accent-type stress on the word level and predictable quantity-sensitive stress on the stem?

3   Stress freezing in Washo

- in Washo (isolate, North America), stress at the word level behaves much like lexical stress

- most verbal and nominal stems and some affixes bear stress independently of where in the word they occur

- all examples from Jacobsen (1964), brackets mark the stem, accents mark stress

(7) "lexical" stress at the word level in verbs[4] with inherently stressed near future marker *-áša?*

a.   l-[íme?]-ši-áša?-i   léme?šiyáša?i   "We are going to drink."
b.   we-[híwi]-áša?-i   wehíwiyáša?i   "It's going to thunder."
c.   l-[íye?]-we?-giš-uwe?-áša?-i   léyewegišuwa?áša?i   "I'm going to go far away."
d.   ?-[íšl]-áša?-i   ?išláša?i   "He will give it [to the man]."

(8) nouns with resultative suffix *-éwe?*
  a. d-[ímge?]-éwe?   dímge?éwe?   "something ground up"
  b. [t'á:gɨm]-éwe?   t'á:gɨm-éwe?   "gathered pine nuts"
  c. [bélpil]-éwe?   bélpiléwe?   "slice"
  d. [sésm]-éwe?   sesméwe?   "vomit"

- the co-occurence of several stresses in one word is restricted only by a constraint against stress clashes, which is satisfied by de-stressing the first of two adjacent stressed syllables (see "d." in (7) and (8), respectively)

- as expected in a lexical stress system (which, for now, appears to be lacking cumulativity), when more than one inherently stressed affix is used, all stresses surface (unless there is a clash)

(9) multiple stresses

a.   l-[íme?]-áša?-é:s-i   léme?áša?é:si   "I'm not going to drink."
b.   di-[melé?yɨk]-šému-áša?-i   dimelé?yɨkšémuyáša?yi   "I'm going to get really drunk."
c.   l-[íme?]-é:s-hé:š-hu-gab-i   léme?eshé:šhugabi   "Aren't we (incl.) going to drink?"

- however, declaring the stress system "lexical" misses important generalizations as the location of stress on stems (roots and roots extended by reduplication) is actually predictable (Yu 2005)

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[4]Alternation in stem-initial vowel quality after some prefixes is analyzed as featural affixation in Staroverov (2016).

(10)　　predictable penultimate stress at the stem level (see also examples above):
　　　a.　bókoŋ　　　"to snore"
　　　b.　bíŋil　　　　"to try"
　　　c.　biŋíŋil　"to try repeatedly"
　　　d.　masát'i　"flint arrowhead"

(11)　　predictable final stress
　　　a.　　gukú:　　　"owl species"
　　　b.　šuʔwé:k　　　"clam"
　　　c.　dawmaʔgá:p　"wet place"

- Yu (2005) shows that polysyllabic stems in Washo are stressed on the penultimate syllable unless the final syllable is heavy (contains an underlyingly long vowel, codas are only moraic when stressed), in which case stress is final

- looking only at the stems reveals that Washo has completely predictable stress: a single quantity-sensitive trochee on the right edge of the stem

- the two following tableaux are exactly as in Yu (2005), with the exception that Yu's categorical ANCHOR-Constraint, which determines the location of the head foot, has been replaced with a classical gradient ALIGN-Constraint (see Stratum 2 for the reason)

- FTFORM: cover constraint for FTBIN and TROCHEE

- ALIGN-R: assign * for every syllable intervening between the right edge of the head foot and the right edge of PrWd

(12)　　weight-sensitive trochees at the stem level:

/masat'i/	FTFORM	ALIGN-R	WSP	PARSE-σ
☞ a. ma(sát'i)				*
b. (mása)t'i		*!		
c. ma(sat'í)	*!			*
d. (ma)(sát'i)	*!			

(13)　　weight-sensitive trochees at the stem level (with long final vowel):

/guku:/	FTFORM	ALIGN-R	WSP	PARSE-σ
☞ a. gu(kú:)				*
b. (gukú:)	*!			
c. (gúku:)			*!	

- in the next step, the stem-level outputs are passed on to the word level, where the stress system is dramatically different, characterized by prosodic faithfulness (cf. Alderete 1999, McCarthy 1997, Pater 2000) and clash avoidance

- HD-DEP: assign * for a syllable that is a prosodic head in the output but not in the input

- HD-MAX: assign * for a syllable that is a prosodic head in the input but not in the output

- DEP-V: assign * for a vowel that in the output without a correspondent in the input

(14)   word-level stress without clash

/l-/ /(íme?)/ /-ši/ /(-áša?)/ /-i/	HD-DEP	*CLASH	FTFORM	WSP	DEP-V	HD-MAX	ALIGN-R
☞ a. (léme?)ši(yáša)?i							*
b. leme?šiya(šá?i)	*!					**	
c. leme?ši(yáša)?i						*!	*

- (b) tries to apply the stem-level system, (c) tries to keep only the rightmost foot, both are ruled out by prosodic faithfulness to the stem-level output

(15)   word-level stress with clash

/(?íšl)/ /(-áša?)/ /-i/	HD-DEP	*CLASH	FTFORM	WSP	DEP-V	HD-MAX	ALIGN-R
☞ a. ?iš(láša)?i						*	*
b. (?íš)(láša)?i		*!					*
c. (?íš)laša?i						*	**!*
d. (?íšɨ)(láša)?i					*!		*

- (a) destresses the first vowel in response to *CLASH, (b) fails to do so, (c) destresses the wrong vowel (determined by ALIGN-R, (d) tries to repair clash by epenthesis

- Yu's (2005) system for stress assignment in Washo is completely compatible with the observations about word-level stress above if Stratal Optimality Theory is adopted

- side note: the particular constraint ranking here also solves a potential conceptual problem for the word level, which does not obviously

show CUMULATIVITY, a property usually associated with stress languages, by uniquely identifying the rightmost foot as the head foot

- Stratal OT allows us to leave the stem-level stress analysis as it is and focus on what happens when the stem-level outputs are passed on to the word-level phonology, that is, begin to interact with inherently stressed affixes[5]

- anticipating a potential confusion: this is **not** metrical incoherence in the empirical sense discussed above, where stress and segmental processes sensitive to feet diagnose irreconcilable metrical structure. It is the same underlying property of the system, namely **reranking of the constraints responsible for stress assignment** which causes stress freezing as a kind of mirror image of stress overwriting as discussed for Tübatulabal above (see Kiparsky 2003 on Ancient Greek)

4 Changing and preserving metrical structure

- under the approach presented in this talk, stress overwriting and stress preservation are two sides of the same coin

- Stratal OT has been argued to provide insights into the relationship between diachronic and synchronic perspectives on grammar (Bermúdez-Otero 2015, Kiparsky 2015a)

- the present investigation matches this claim perfectly: as argued in Gordon (2016), it is likely that the diachronic explanation for metrical incoherence typically involves an innovated stress system surplanting an older one

- in Stratal OT, the phonological reflexes of the "old" system can still receive an analysis as synchronically predictable, this strategy is particularly attractive in languages like Tübatulabal, where the morphological alternative would require massive amounts of suppletion

- due to the rhythmic, iterative character of both Alternating Length and stress in Tübatulabal, metrical incoherence there also cannot be reduced to a mismatch between phrase-level intonation and word stress,

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[5]In Benz (2018), I argue for an additional stratum between what I am here calling the stem stratum (there: "extended root" stratum) and the word. Here, I will assume that all affixes are added at the word level, this decision does not effect the argument.

as proposed by Gordon (2016) for many other cases of metrical incoherence

- for Washo, there might be a diachronic factor of a very different nature: it is conceivable that the stressed suffixes previously introduced separate prosodic words

- while Washo does not show metrical incoherence in the classic sense, it also shows an effect of word-internal reranking that cannot be characterized as mere cyclicity

- do we need the full power of reranking to account for stress systems with incoherent properties?

Conclusion:

- in Stratal OT, the question of what happens to metrical structure throughout the derivation is back

- I have shown using examples from Tübatulabal and Washo how stress can be overwritten or preserved by the constraint ranking at a later stratum

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