

Affix order in Washo and the availability of phonological information

Johanna Benz
Universität Leipzig
benz@studserv.uni-leipzig.de

1 Introduction

Claim: Affix order in Washo is phonologically conditioned, providing evidence for “limited global” interactions of morphology and phonology.

More specifically:

- in Washo, stem-level suffixes are reordered to avoid a stem-final stressed syllable
- a Stratal OT analysis: at the stem level, the phonological constraint NONFINALITY outranks morphological alignment constraints (making this a $P \gg M$ (*Phonological* \gg *Morphological*) analysis, see McCarthy & Prince 1993, Paster 2006a,b, 2009)
- unstressed suffixes are later added at the word level but counterbleed the observed change in affix order
- because this phenomenon involves (under the present analysis) a crucial and not entirely local interaction of morphological and phonological constraints, it contributes to our understanding of the availability of phonological information to morphology and points towards a model that allows “limited global” interaction (see Embick 2010)

2 PCAO

- “phonologically conditioned affix order”: semantically and/or morphologically unexpected affix order triggered by phonological con-

straint(s), affixes may be more than one segment long

- affix order in Washo is *non-transitive* (cf. Ryan 2010) and *opaque* (cf. Stiebels 2003), **but the deviations from “expected” affix order are not random, they can be explained by NONFINALITY-triggered avoidance of a stem-final stressed syllable**
- Washo (isolate, North America) is polysynthetic, mostly suffixing. The language is spoken in the Lake Tahoe area on the California/Nevada state line by about 10 elderly speakers
- today, we will look at some infinite and finite verb forms
- data from Jacobsen (1964, 1973), who also identified the pattern as phonologically conditioned

- (1) geyúliyé:sha
 ge-yúli-é:s-ha
 IMP-die-NEG-CAUS
 “Don’t kill it!”

First observations and further information:

- affix order in (1) is semantically opaque
- stress behaves much like lexical stress: in particular, we will see that some affixes, such as negative *-é:s* and most verbal roots always bear stress independently of their position in the word
- usually in Washo, causative *-ha* appears close to the verbal root, while negative *-é:s* appears relatively late in the stem¹

Table 1: Partial template of the Washo verb based on Jacobsen (1964)

slot	-1	0	+1	+2	+3	+4	+5	+6	+7
morphemes	PERS.SUBJ	Verb	INCH	PL.INCL	NEAR.FUT	NEG	REC.PST	IND	SR
	PERS.OBJ		TRANS	DU.INCL		Q	DIST.FUT	DEP	
	IMP			CAUS			INT.FUT	REDUN	
				DUR				OPT	

¹Abbreviations: 1SBJ: first person subject, DU.INCL: dual inclusive, PL.INCL: plural inclusive, NEAR.FUT: near future, DIST.FUT: distant future, INT.FUT: intermediate future, IND: independent mood, NEG: negation, Q: interrogative, DEP: dependent mood, REDUN: redundant, OPT: optative, CAUS: causative, REC.PST: recent past, IMP: imperative, DUR: durative, TRANS: transitory, INCH: inchoative, SR: switch reference

(2) lémeʔhuyášaʔi
le-ímeʔ-**hu-ášaʔ**-i
1 SBJ-drink-**PL.INCL-NEAR.FUT**-IND
“We (incl.) are going to drink.”

(3) lémaʔášaʔé:si
le-ímeʔ-**ášaʔ-é:s**-i
1 SBJ-drink-**NEAR.FUT-NEG**-IND
“I am not going to drink.”

- from (2)-(3) we might infer: if **PL.INCL-NEAR.FUT** and **NEAR.FUT-PL.INCL**, then **PL.INCL-NEG**
- instead, we find *non-transitive* **NEG-PL.INCL**

(4) lémeʔé:shuyi
le-ímeʔ-**é:s-hu**-i
1 SBJ-drink-**NEG-PL.INCL**-IND
“We (incl.) are not drinking.”

More affixes in unexpected places:

(5) lémeʔé:silegi
le-ímeʔ-**é:s-ši**-leg-i
1 SBJ-drink-**NEG-DU.INCL-REC.PST**-IND
“We (both of us) didn’t drink.”

(6) lémeʔhéhé:šhugabi
le-ímeʔ-**hé:š-hu**-gab-i
1 SBJ-drink-**Q-PL.INCL-DIST.FUT**-IND
“Are we (incl.) going to drink?”

(7) gayáhayetihé:šha-i-š
ge-yáha-etiʔ-**hé:š-ha**-i-š
3 OBJ-hurt-**INCH-Q-CAUS-IND-SR**
“Perhaps it started to hurt him.”

(8) lakLášdimé:shayiŋa
le-kLášdim-**é:s-ha**-i=ŋa
3 SBJ.1 OBJ-hide-**NEG-CAUS-IND**=but
“But (they) don’t conceal it from me.”


- (9) ʔumk'uyéʔešlelhé:šuší
 ʔum-k'uyéʔeš-lel-**hé:š-uš**-i
 2SBJ-swim-TRANS-**Q-DUR**-IND
 “Have you been swimming any?”

3 Washo verbs in Stratal OT

- stratal organization of Washo morphology and phonology:
- Stratum 0 “extended root”: reduplication, stress assignment (see Yu 2005)
- Stratum 1 “stem”: affixation stem-level affixes, **PCAO**
- Stratum 2 “word”: affixation word-level affixes
- suffixes in Washo form two classes: *stem-level* (cf. Jacobsen 1964 stem-formative suffixes) and *word-level* (cf. Jacobsen 1964 prefinal and final suffixes, slots +5 and +6 in Table 1). Some stem-level suffixes bear inherent stress, all word-level suffixes are unstressed. **Justification for level assignment:** Only stem-level suffixes appear on infinite verb forms (base for nominalizations, imperatives).

Stratum 1: Stem-level suffixes (simplified)

(10)

/ímeʔ/, /hu/, /é:s/	NONFINALITY	NEG-R	INCL-R
a. ímeʔ-hu-é:s	*!		*
 b. ímeʔ-é:s-hu		*	

- morphemes are unordered in the Input, only stem-level affixes present
- NEG-R: assign * for every morpheme intervening between NEG and the right edge of PrWd (compare McCarthy & Prince 1993)
- something to be explicit about: these constraints enforce a morphological template. I take this to be suboptimal (because it does not reflect insights from theories such as Distributed Morphology), but preferable to a system that determines affix order twice (undermining DM just as much)
- NONFINALITY: assign * for a stressed syllable that is final in PrWd (Prince & Smolensky 2004)

- in addition, at least two further phonological constraints have to be considered:
- MÁX: assign * for a syllable that is stressed in the Input but not in the Output (cf. Pater 2000)
- *CLASH: assign * for a stressed syllable that is immediately followed by another stressed syllable (Kager 1999)
- morphologically preferred order (**semantically transparent, transitive**) encoded in morpheme alignment constraints (also see Potter 1996, who relates alignment constraints to the Mirror Principle (Baker 1985))
- **NONFINALITY can cause violation of alignment**, but alignment is violated minimally
- on Stratum 2, prefixes and word-level suffixes are added. The word-level suffixes are never stressed, so they never violate the phonological constraints active at the stem level
- if the last syllable is not stressed in the candidate with the order of affixes corresponding to the ranking of alignment constraints at the time of evaluation of Stratum 1, NONFINALITY will be satisfied and the order will stay as expected, as in (2)

(11)

/íme?/, /hu/, /áša?/	*CLASH	MÁX	NONFIN	NEAR.FUT-R	INCL-R
☞ a. íme?-hu-áša?					*
b. íme?-áša?-hu				*!	

- NONFINALITY-driven reordering is blocked exactly in the cases where it would give rise to a clash, as in (3)

(12)

/íme?/, /áša?/, /é:s/	*CLASH	MÁX	NONFIN	NEG-R	NEAR.FUT-R
☞ a. íme?-áša?-é:s			*		*
b. íme?-áša?-es		*!			*
c. íme?-é:s-áša?	*!			*	
d. íme?-es-áša?		*!		*	

4 $P \gg M$, Locality and Modularity

- the constraint system and its evaluation as proposed in the previous section allows for interaction of morphological and phonological

constraints within the same module (note: individually, phonological constraints are not morphologically or lexically indexed)

- the non-local, non-modular character of this interaction results from the (Stratal) OT implementation and $P \gg M$ ranking. How to allow for phonological information to interfere with morphology has been discussed largely with respect to phonologically conditioned suppletive allomorphy (PCSA, see Paster 2006, Embick 2010 among many others)
- is “limited global” interaction necessary to determine PCAO in Washo?
- Paster (2006a,b, 2009) claims that all known cases of PCAO can be reanalyzed as segmental metathesis or (a type of) infixation
- claim for Washo: “[...] stressed suffixes subcategorize for a foot to their left.” (Paster 2006a:229)

(13) lémaʔášaʔé:shuyi
 le-ímeʔ-ášaʔ-é:s-hu-i
 1 SBJ-drink-NEAR.FUT-NEG-PL.INCL-IND
 “We (incl.) aren’t going to drink”

(14) a. *le-[ímeʔ]_{Ft}-é:s-hu-ášaʔ-i
 b. *le-[ímeʔ]_{Ft}-hu-[ášaʔ]_{Ft}-é:s-i
 c. (i) le-[ímeʔ]_{Ft}-ášaʔ-hu \downarrow
 (ii) le-[ímeʔ]_{Ft}-[ášaʔ]_{Ft}-é:s-hu-i

- (13) is a more complex example where plural inclusive *-hu* is displaced to the right across two other affixes
- (14) shows that the subcategorization approach fails to predict the attested affix order
- this is not surprising considering that Paster (2009) explicitly states that subcategorization predicts only pairwise ordering effects
- in the $P \gg M$ system, the more global reordering effects in (13) are predicted and accounted for
- as pointed out in Embick (2010) and discussed for PCSA in Deal & Wolf (2017), Stratal OT is more restrictive than fully parallel OT in

predicting effects like PCAO only within a given cycle (here: one cycle per stratum)

	/ímeʔ/, /hu/, /ášaʔ/, /é:s/	*CLASH	MÁX	NONFIN	NEG-R	N.FUT-R	INCL-R
(15)	a. ímeʔ-hu-ášaʔ-é:s			*!		*	**
	b. ímeʔ-hu-ášaʔ-es		*!			*	**
	☞ c. ímeʔ-ášaʔ-é:s-hu				*	**	
	d. ímeʔ-é:s-hu-ášaʔ				**!		*
	e. ímeʔ-é:s-ášaʔ-hu	*!			**	*	

5 Summary & Discussion

Properties of the proposal...

1. $P \gg M$

- morphological alignment constraints are outranked by phonological constraints within the same module
- the analytical intuition: **affixes may move to obey constraints on stress distribution, the stress itself may not**
- morphemes are unordered in the input to avoid redundant ordering specifications
- **NONFINALITY can cause violation of alignment**, but alignment is violated minimally; this may result in a non-transitive, potentially opaque order which is passed on to Stratum 2

2. Stratal Organization

- only the stem-level affixes are present at Stratum 1
- evidence for the “cut-off point” comes from imperatives and nominalizations, which include stem-level, but not word-level affixes
- on Stratum 2, prefixes and word-level suffixes are added; the word-level suffixes are never stressed, so they never violate NONFINALITY
- however, if the order of affixes has already been changed on Stratum 1, the addition of these later suffixes **counter-bleeds** the change
- it is this counter-bleeding opacity that makes strata a necessary component of this proposal

- (16) lémeʔé:shuyi
 le-ímeʔ-é:s-hu-i
 1 SBJ-drink-NEG-PL.INCL-IND
 “We (incl.) are not drinking.”

	/ímeʔé:shu/, /le/, /i/	P-L	MOOD-R	*CLASH	MAX-STR	NONFIN
(17)	a. le-ímeʔé:shu-i		*!			
	b. le-ímeʔé:shu-i					
	c. ímeʔé:shu-le-i	*!				

...and why they matter

- the extent to which phonological effects on morphology are derived and predicted in serial and parallel models differs dramatically (see discussion in Embick 2010)
- PCAO in Stratal OT instantiates what Embick (2010) calls “limited global” interaction of morphology and phonology
- strata are not just a necessary evil (recall: they are introduced to model opacity), they also **restrict phonologically conditioned morphology to the stratum as a locality domain**
- Embick’s (2010) claim about the locality of interaction between morphology and phonology is too strong (see Deal & Wolf 2017 for a similar argument based on data from outward-sensitive phonologically conditioned allomorph selection in Nez Perce)

References

Baker, Mark C. (1985): ‘The mirror principle and morphosyntactic explanation’, *Linguistic Inquiry* **16**, 373–415.

Deal, Amy Rose and Matthew Wolf (2017): Outwards-sensitive phonologically-conditioned allomorphy in Nez Perce. In: V. Gribanova and S. Shih, eds, *The Morphosyntax-Phonology Connection*. Oxford University Press, Oxford, pp. 29–60.

Embick, David (2010): *Localism versus globalism in morphology and phonology*. MIT Press, Cambridge.

Jacobsen, William H. (1964): A grammar of the Washo language. PhD thesis, University of California, Berkeley.

Jacobsen, William H. (1973): A rhythmic principle in Washo morphotactics. Presentation at Symposium on California Indian Linguistics.

- Kager, René (1999): *Optimality Theory*. Cambridge University Press, Cambridge.
- Kiparsky, Paul (2015): Stratal OT: a synopsis and FAQs. In: Y. E. Hsiao and L.-H. Wee, eds, *Capturing phonological shades within and across languages*. Cambridge Scholars Publishing, Newcastle upon Tyne, pp. 2–44.
- McCarthy, John J. and Alan Prince (1993): Generalized Alignment. In: G. E. Booij and J. van Marle, eds, *Yearbook of Morphology 1993*. Kluwer, Dordrecht, p. 79–153.
- Paster, Mary (2006a): Phonological Conditions on Affixation. PhD thesis, University of California, Berkeley.
- Paster, Mary (2006b): A survey of phonological affix order with special attention to Pulaar. In: L. Bateman and C. Ussery, eds, *Proceedings of NELS 35: Volume 2*. University of Massachusetts Graduate Linguistics Student Association, Amherst, p. 491–506.
- Paster, Mary (2009): ‘Explaining phonological conditions on affixation: Evidence from suppletive allomorphy and affix ordering’, *Word Structure* **2**, 18–47.
- Pater, Joe (2000): ‘Non-uniformity in English secondary stress : the role of ranked and lexically specific constraints’, *Phonology* **17**, 237–274.
- Potter, Brian (1996): Minimalism and the Mirror Principle. In: K. Kusumoto, ed., *Proceedings of NELS 26*. University of Massachusetts Graduate Linguistics Student Association, Amherst, pp. 289–302.
- Prince, Alan and Paul Smolensky (2004): *Optimality Theory: Constraint Interaction in Generative Grammar*. Blackwell, Oxford.
- Ryan, Kevin M. (2010): ‘Variable affix order: grammar and learning’, *Language* **86**, 758–791.
- Stiebels, Barbara (2003): Transparent, restricted and opaque affix orders. In: U. Jung-hanns and L. Szucsich, eds, *Syntactic structures and morphological information*. Mouton de Gruyter, Berlin, pp. 283–315.
- Yu, Alan C. L. (2005): ‘Quantity, stress and reduplication in Washo’, *Phonology* **22**, 437–475.