Positional faithfulness and the theory of intermediate stages in phonological development

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1 Intermediate stages that preserve input positions

The Data

*Summary: At some intermediate stages, children are preferentially faithful to phonological material in the privileged positions of target words: that is, of **inputs***

1) Faith to English stressed initial syllables
(from Kehoe 2000, tables 4,7,10)

Subject	*Target*	*Child*	*Target*	*Child*
	/wSw/	**[Sw]**	**/SwSw/**	**[SSw]**
a) 22m3	banána	[nénʌ] [néŋʌ]	álligàtor	[ɛ́gè.ʌ]
b) 22f1	banána	[nénʌ] [nénə]	álligàtor	[ɛ́gɛ̀də˞]
c) 27m6	banána	[báni]	àvocádo	[ə̀kádo]
d) 28f2	banána	[bɛ́:nʌ]	àvocádo	[ə̀kádo]

2) Faith to Greek initial pretonic syllable
(from Revithiadou and Tzakosta 2004, ex. 6)

Subject	*Target*	*Child*	*Gloss*
	/w_1w_2Sw/	**[w_1Sw]**	
a) B1 2;09	/kalamáci/	ka:(má.ci)	'straw-dim'
	/ɣurunáca/	ɣu(ná. ca)	'pigs-dim'
b) D 2;04.05	/melitíni/	me(tí.ni)	(name)
	/fotoɣrafíes/	fa(fĭ.eθ)	'photos'

The Positional Faith Analysis in the spirit of Beckman (1998)

Assumed initial ranking (e.g. Smolensky 1996):
all Markedness >> all Faith

At these intermediate stages:
Positional-Faith >> Mkdness >> General-Faith

MAX('σ): *Input stressed syllables* must have output correspondents

4a) the English intermediate stage 'banana'

/wSw/	**Max('σ)**	*MarkedFt	Max(σ)
☞(Sw)			*
(S)(Sw)		*!	

4b) the English intermediate stage 'avocado'

/SwSw/	**Max('σ)**	*MarkedFt	Max(σ)
(Sw)	*!		*
☞(S)(Sw)		*	

MAX(σ1): *Input initial syllables* must have output correspondents

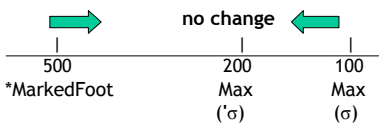
5) the Greek intermediate stage

/w_1w_2Sw/	**Max(σ1)**	Align-Ft-L	Max(σ)
(Sw)	*!		**
☞w_1(Sw)		*	*
w_2(Sw)	*!	*	*
w_1w_2 (Sw)		**!	

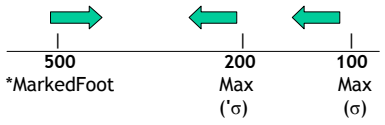
2 Why not use the GLA to derive these stages?

The Gradual Learning Algorithm (e.g. Boersma 1997) promotes each faith constraint every time it prefers a faithful output (*winner*) over the current ranking's output (*loser*)

6) GLA re-ranking effect of 'banana'
Markedness demoted, **only Gen-Faith promoted**



7) GLA re-ranking effect of 'avocado':
Markedness demoted, **both Faith promoted**



*Problem: Positional-Faith prefers **fewer** winners, but must be promoted **faster***

3 Deriving intermediate stages with a different learner: the Error-Selective approach (Tessier 2006)

Summary of error-selective learning:
- based on the constraint demotion algorithms of Prince & Tesar (2004); Hayes (2004)
- these algorithms reason from errors to constraint rankings using *ranking biases*
- at each stage, the error-selective learner chooses to learn only from errors requiring *minimal* re-ranking

Here is how an error-selective learner with a biased CD algorithm can derive the English intermediate stage

3.1 Choosing an error to learn from

Initial ranking: M >> F, including *MarkedFt >> Max('σ), Max(σ)

8) **some example errors** made at this stage:

target	*winner~loser*	**All-Ft-L**	*MrkdFt	Parse-σ	Max('σ)	Max(σ)
'raccoon'	(rə̀)(kún)~(kún)	L	L	e	W	W
'shampoo'	(ʃə̀m)(pú)~(pú)	L	L	e	W	W
'banana'	bə(nə́nə)~(bə́ni)	L	e	L	e	W

The learning trigger:

when an M constraint (here **All-Foot-L**) has caused *too many errors*, the error-selective learner must pick one error to learn a new ranking from...

Two criteria for selecting an error:
1. violates the trigger (here All-Ft-L), and...
2. satisfies *the most Faith* constraints

9) **the error selected:** 'raccoon'

winner~loser	All-F-L	*MrkdFt	Parse-σ	Max('σ)	Max(σ)
(rə̀)(kún)~(kún)	L	L	e	W	W

3.2 The ranking biases

Until errors prove otherwise:

1. Markedness >> Faith (Smolensky 1996, Prince & Tesar 2004, Hayes 2004)
2. Specific-Faith >> Gen-Faith (Smith 2000, Hayes 2004, Tessier 2006)

3.3 Re-ranking effect of 9) via a biased CD algorithm

1. Install all M constraints that prefer no Losers: Parse-σ
2. Install all M constraints that prefer no Losers: (*all prefer an L*)
   So install the W-preferring F constraint with *the most specific context:* Parse-σ >> **Max('σ)**
3. Install all M constraints that prefer no Losers: Parse-σ >> **Max('σ)** >> All-F-L,***MarkedFt**
4. Install all M constraints that prefer no Losers: (*none left*)
   So install all remaining F constraints: Parse-σ >> **Max('σ)** >> All-F-L,***MarkedFt** >> **Max(σ)**

Result: the learner's new ranking includes **Max('σ) >> *MarkedFt >> Max(σ)**
This is the intermediate stage grammar in 4)!

4 Interim conclusions

- some intermediate phonological stages require faithfulness to input positions
- a learner that promotes Faith as often as it prefers winners will not show such stages
- on the other hand, these stages can be derived using a BCD-style algorithm...
- ...if the learner chooses the right errors to learn from

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