USELISTEDERROR: A grammatical account of lexical exceptions in phonological acquisition

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Overview This talk presents an analysis of lexical exceptions in phonological acquisition – i.e. words that do not conform to a child's currently-stable phonology – within an error-driven OT learning framework (Tesar and Smolensky 2000; Prince and Tesar 2004; Hayes 2004.) The core of the proposal is that learners store some of their errors made with previous grammars, and that learners are under pressure to be 'lazy', by producing stored errors rather than submitting words to the full scrutiny of subsequent grammars.

Data Two kinds of developmental lexical exceptions are discussed here: *fossilized words* that retain old pronunciations after the grammar has otherwise moved forward (see 1), and *precocious words* that are pronounced more accurately than the rest of the grammar's outputs (see 2). These exceptions appear to be anecdotally quite common in child phonologies (e.g. Bleile and Tomblin 1991; Gierut 1987; Macken 1979; Macken and Ferguson 1983; Menn 1976, 1983) but the phenomena have not previously been analyzed within the grammar *per se* in any formal models of phonological development.

Proposal The heart of the learning algorithm assumed here lies in its stored errors, which drive the learner to build each new grammar. Such a learner has two methods of producing words: using the current grammar to choose an optimal output among all the available options, or simply reproducing a stored error form, previously deemed optimal by an earlier grammar. The OT constraint proposed here to choose between these two methods is USELISTEDERROR (inspired by a proposal in Zuraw 2000), which prefers the lazy option of reproducing stored errors (see 3).

Adding USELISTEDERROR to the normal panoply of markedness and faithfulness constraints provides a learner that can pass through stages with both fossilized and precocious forms. This learner begins with the ranking USELISTEDERROR >> MARKEDNESS >> FAITHFULNESS. As proposed in Tessier (2007), the learner gradually chooses errors to store, and uses a version of Biased Constraint Demotion (Prince and Tesar 2004; see also Hayes 2004) to build each new ranking, by resolving all stored errors while otherwise maintaining as many of the initial rankings as possible. In this framework, a learner may end up storing an error like (4b), made on a word with no previously stored form; this will create a *fossilized* version of that error at the next stage (see 4d-e).

To account for precocious forms, the learner must be extended to construct child-specific constraints, designed e.g. to alleviate pressures on children's articulation and co-ordination (here, see esp. Rose and Inkelas 2006 on velar fronting.) If the learner stores some early errors and later adds a child-specific markedness constraint like 'VELARFRONTING' to the grammar, below USELISTEDERROR, this ranking can produce precocious forms (see 5).

Discussion This analysis of lexical exceptions retains the intuition that exceptional words somehow 'escape the core grammar', yet it allows their exceptionality to be encoded grammatically so that it can be both derived and eventually overcome via the mechanism used for normal learning. The approach also makes empirical predictions about developmental exceptions that must be tested in future research: e.g., that precocious forms will specifically resist child-specific processes, as reported by Menn (1971) for one child's pattern of nasal harmony. More broadly, it lends support to the claim that results from theoretical learnability work can also increase our understanding of children's natural phonological development.

Data

1) ***An example of fossilization*** (data from Compton and Streeter 1977; Pater 1997)

a) /tr/ clusters retained — b) except in child's name 'Trevor', where /tr/ → [tʃ]

'truck'	[tɹʌk] (2;2.23)	[tʃɛvəː]	(2;3.04)
'train'	[tɹeːn] (2;2.23)	[tʃɛvəː]	(2;4.03)
'try'	[tɹai] (2;4.03)	[tʃɛvəː]	(2;4.13)

2) ***An example of precociousness*** (data from Bleile and Tomblin 1991)

a) initial, stressed velars frontedb) except for an exceptional set:

'candy' /kændi/	→ [tændi]	'clown' /ˈklaʊn/	→ [kaʊn]
(inferred example)		'okay' /oˈke/	→ [oˈke]

3) **USELISTEDERROR** (ULE): Assign a violation mark to any output form that is *non-identical* to an input's stored loser form

4) ***Creating a fossilized form***

a) Initial stage: USELISTEDERROR >> NOCODA >> MAX

b) A stored error that might be learned from: deleting the coda of 'dog'

input 'dog'	*winner ~ loser*	USELISTEDERROR	NOCODA	MAX
/dag/	dag ~ da	**e**	**L**	W

c) Next stage, with fossilized forms: USELISTEDERROR >> MAX >> NOCODA

d) Most codas preserved…

/kaet/ (**no stored loser)**	ULE	MAX	NOCODA
☞ a) kaet			*
b) kae		*!	

e)… *except* for the fossilized (4b)!

/dag/ **stored [da]**	ULE	MAX	CODA
a) dag	*!		*
☞ b) da		*	

5) ***Creating precocious forms***

a) Initial stage: No velar fronting constraint yet created, but other errors made, stored...

b) Next stage, with precocious forms: USELISTEDERROR >> VELARFRONTING (= *K) >> IDENT-PLACE

c) New words show velar fronting…

/kændi/ (**no stored loser)**	ULE	*K	ID-PLACE
a) kændi		*!	
☞ b) tændi			*

d) … *except* errors made before *K created!

/ klaʊn / **stored: [kaʊn]**	ULE	*K	ID-PLACE
☞ a) kaʊn		*	
b) taʊn	***!**		*

Selected References Bleile, K. and J. B. Tomblin. 1991. Regressions in the Phonological Development of Two Children. *Journal of Psycholinguistic Research 20* no. 6, 483- 499. • Pater, Joe. 'Minimal Violation and Phonological Development'. *Language Acquisition* 6(1). • Prince, A. and B. Tesar. 2004. Learning Phonotactic Distributions. In R. Kager, Joe Pater & Wim Zonneveld,(eds.), *Fixing Priorities: Constraints in Phonological Acquisition*. Cambridge, U.K.: Cambridge University Press. • Tesar, Bruce and Paul Smolensky. 2000. *Learnability in Optimality Theory*. Cambridge, MA: MIT Press. • Tessier, A.M. 2007. *Biases and Stages in Phonological Acquisition.* Ph.D. dissertation, UMass Amherst. • Zuraw, K. 2000. *Patterned Exceptions in Phonology*. Ph.D. dissertation, UCLA.