

# Child consonant harmony and phonologization of performance errors

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## The child consonant harmony puzzle

- A much-studied problem in child phonology: Consonant harmony (CH) for major place of articulation.
- Child CH has no counterpart in adult typology.

a.	'duck'	[gʌk]
b.	'tickle'	[gɾ:gu:]
c.	'top'	[pap]
d.	'cut'	[kʌk]
e.	'cup'	[kʌk]

- Accounts differ in whether child CH should be analyzed as phonological (e.g. Pater, 2002; Goad, 2004; Becker & Tessier, 2011) or performance-based (e.g. Hale & Reiss, 1998, 2008).
- Systematic properties support a grammatical analysis (from Pater 2002, p. 364):
  - 1.Target/Undergoer: Non-coronal implies coronal
  - 2.Trigger: Labial implies velar
  - 3.Direction: Progressive implies regressive

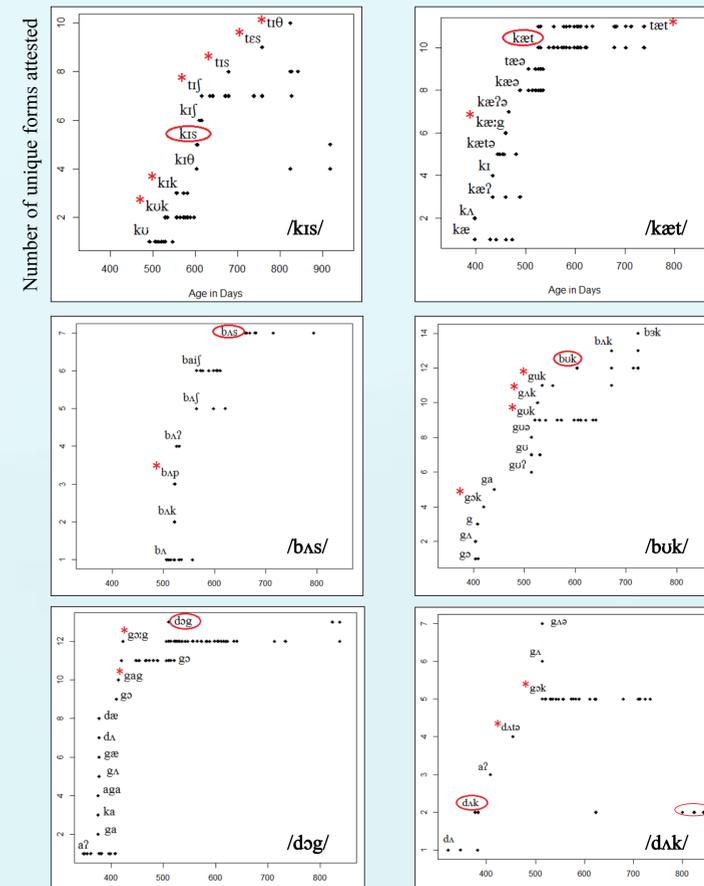
## A reflection of performance biases?

- But CH usually applies in only a minority of opportunities.
- Also, speech errors show similar biases (Hansson, 2001):
  1. Target/Undergoer: Speech errors frequently feature coproduction of target and error gestures, and velar gestures typically overshadow coronal (e.g. Pouplier, 2008).
  2. Trigger: Similar speech sounds, e.g. two lingual stops, are more likely to interact in speech errors (e.g. Fromkin, 1971; Shattuck-Hufnagel & Klatt, 1979).
  3. Direction: Around 75% of adult speech errors are anticipatory/regressive (Schwartz et al., 1994).

**In corpus data, is child CH more consistent with performance errors (random/variable) or phonological processes (stable/categorical)?**

## Between competence & performance

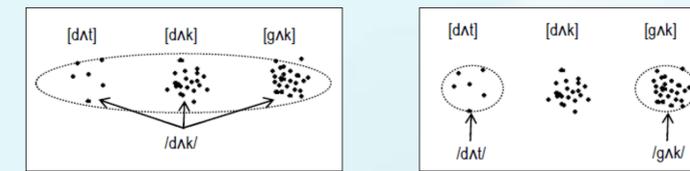
- Both grammar and performance effects are evident in a close inspection of data from the Trevor corpus (Compton & Streeter, 1977; Pater, 2002; Becker & Tessier, 2011).
- Evidence for performance:
  - CH only applies in around 15% of relevant contexts.
  - Extensive variability, both within and across lexical items.



- Conclusion: Neither entirely random nor entirely systematic.
- A satisfactory model of CH must be able to capture...
  - Sub-regularities at the level of individual lexical items.
  - Alternating periods of variability and stability.

## Phonologization of performance

- We propose that child patterns like CH can arise from transient phonologization of performance errors.
- A-map/RECYCLE** (McAllister Byun, Inkelas & Rose, 2012):
- A-map: Grammatical module tracking reliability with which selected motor plans map onto acoustic exemplar space.
  - Complex targets are associated with frequent performance errors, yielding an unstable mapping.



- RECYCLE: A weighted constraint penalizing candidate forms in proportion to their stored A-map scores.
  - Exerts grammatical pressure to continue using an error form that has a reliable motor-acoustic mapping.
  - In tension with PMATCH (see Steriade, 2001), which favors perceptual match with acoustics of the adult input.

	Adult target: [dʌk]	PMATCH	RECYCLE	H
		w = 1	w = 1	
a.	dʌk		-2	-2
b.	dʌt	-1	-1	-2
c.	gʌk	-1.25	-2.5	-1.5

- As A-map changes over development, pressure to recycle stored errors in place of adult target is eliminated.

## Advantages of a RECYCLE approach to CH

- Individual words' differing A-map scores produce lexically specific patterns.
- RECYCLE model incorporates a functional motivation for children's apparent preference to repeat certain error forms.
- RECYCLE model can capture speech error parallels and explain maturational elimination of CH from the grammar.



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