

## Positional Neutralization: a Case from First Language Acquisition

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This paper presents an apparent challenge from child language to theories of positional neutralization, the phenomenon whereby phonological contrasts are neutralized in certain positions in the word or syllable. Existing theories assume that segmental contrasts are favored in phonologically strong positions, e.g. word-initial or stressed syllables (see e.g. Steriade 1997, Beckman 1997, Zoll 1998, De Lacy 2001, Smith (in prep)); these are also the positions that children preferentially attend to and more accurately reproduce (e.g. Fikkert 1994, Pater 1996, Rose 2000, Curtin 2001). Our new longitudinal study of one child, however, reveals two segmental neutralizations which occur *only* in strong positions.

E, a monolingual learner of American English, exhibited “velar fronting”, systematically replacing velars (/k/, /g/) with coronals (/t/, /d/), for 13 months (ages 1;1-2;2). As seen in (1), velar fronting occurred only word-initially or in the onsets of primary- or secondary-stressed syllables. Elsewhere, the velar-coronal contrast was maintained. (See Chiat 1983, Stoel-Gammon 1996, and Bills & Golston 2001 for similar cases.)

(1)	Adult	Child	age (yr;mo)	Adult	Child	age
	<i>Target velars produced as coronal</i>			<i>Target velars produced as velar</i>		
	‘come’	[ <u>t</u> <sup>h</sup> ʌm]	1;09	‘soccer’	[ <sup>h</sup> sɑkɹ]	1;10
	‘conductor’	[ <u>t</u> ʌn <sup>h</sup> dʌktə]	2;01	‘octopus’	[ <sup>h</sup> ɑk.tə.pʊs]	2;01
	‘again’	[ə <sup>h</sup> dʌɪn]	1;10	‘duck’	[ <sup>h</sup> dʌk]	1;09
	‘alligator’	[ <sup>h</sup> æwə.dʒɪ.tə]	2;01			

For an overlapping 13-month period (1;8-2;9), E systematically replaced target /l/ with /j/ in the onsets of words and stressed syllables, but not elsewhere (where it was generally /w/):

(2)	<i>Target /l/ produced as /j/</i>			<i>Target /l/ produced as /w/</i>		
	‘lunch’	[ <sup>h</sup> ʌntʃ]	1;10, 2;8	‘helicopter’	[ <sup>h</sup> hæwɹ.t <sup>h</sup> ʌkətə]	1;11
	‘Livan’	[ <sup>h</sup> ji <sup>h</sup> van]	1;10	‘fell’	[ <sup>h</sup> fɛw]	2;0
	‘violin’	[ <sup>h</sup> vajə <sup>h</sup> liːn]	2;5	‘Goldilocks’	[ <sup>h</sup> gɔw <sup>h</sup> di.jɔks]	2;4
	‘Goldilocks’	[ <sup>h</sup> gɔw <sup>h</sup> di.jɔks]	2;4			

We offer different explanations for the origins of the two patterns. For velar fronting, the motivating factors are largely articulatory. Consonants in English exhibit greater duration and lingua-palatal contact when “strong”, i.e. in the onset of a word or stressed syllable; as a result, strong velars are more difficult than weak velars for young children (with larger tongue-to-vocal tract ratio than adults) to produce accurately. This motor difficulty may initially have led E to produce strong velars that sounded like coronals, a phonetic result that he then phonologized; alternatively, E may (at some level) have recognized the articulatory challenge presented by strong velars and substituted the easier coronals instead.

For /l/ → /j/, we hypothesize an acoustic source: in adult English, initial laterals are “clear” (apical) while finals are “dark” (dorsal). Although Sproat & Fujimura (1993) show this to be a gradient effect of gestural phasing in adult speech, we hypothesize that E interpreted it as discrete, assigning clear and dark /l/ to different phonemes. The pre-existing prosodic condition on velar fronting made it natural for him to ascribe the lateral alternation to the same environment, resulting in the congruent patterns of neutralization seen above.

In conclusion, we concur with Bernhardt & Stemberger’s (1998) view that child language may sometimes be a better test than adult language for what is possible in human grammar. The functional considerations affecting children’s developing grammars can differ from those of adults; presumably, the formal considerations are the same. Segmental neutralization *can* occur only in strong positions, as long as there is a good reason for it.