

PHONEME CONSISTENCY VS. LEXICAL FREQUENCY IN HEBREW RHOTIC ACQUISITION

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Introduction: This paper examines the role of phoneme consistency in Hebrew rhotic (*ʁ*) acquisition. Based on evidence I provide, I propose that phoneme consistency (i.e. the degree of allophonic variation a phoneme displays in a given prosodic context) is a major factor in determining acquisition order. Furthermore, I suggest that positional frequency in the lexicon does not play a noticeable role in *ʁ* acquisition. Phoneme consistency biases acquisition order, the less consistent onset *ʁ* allophony hindering the necessary generalisations required for its encoding, abstract representation and production compared to consistent coda *ʁ*s.

Previous research: *ʁ* is about the last consonant to be fully acquired in Hebrew (Lavie 1978, Ben-David 2001). Assuming three stages of segmental acquisition (deletion → substitution → faithful *ʁ*), Ben-David et al.'s (submitted) cross-sectional study shows that word-final and word-medial *ʁ*s complete these stages before word-initial *ʁ*s (Ben-David et al. do not distinguish between word-medial codas and word-medial onsets). Compared to other segments' acquisition, a strange pattern emerges in the acquisition of the Hebrew *ʁ*. Although the late acquisition of rhotics is common cross-linguistically (Bosma-Smit et al. 1990 for English, Hua & Dodd 2000a/2000b for Putonghua, Amayreh and Dyson 1998 for Jordanian Arabic, Freitas 1994 for Portuguese inter alia), the patterning of Hebrew *ʁ*'s acquisition (i.e. being fully acquired in coda position before being fully acquired in onset position), is unusual. This stands in sharp contrast to other Hebrew consonants, where onset acquisition precedes coda acquisition. In Cohen et al.'s (2013), an extensive acoustic study of *ʁ* allophony variation in Hebrew, controlling for position and neighbouring segments, prosodic position is shown to affect phoneme consistency. Word-final *ʁ*s show more consistency (approximants with some frication and devoicing), while word-initial *ʁ*s show considerable inconsistency, surfacing as approximants, fricatives, trills, taps and even plosives.

Data and analysis: The current study is based on transcriptions and acoustic analyses (PRAAT – Boersma & Weenink 2014) of weekly recordings the natural speech of two infants during acquisition from the onset of speech until the completion of *ʁ* acquisition (data are drawn from the Language Acquisition Project directed by Bat-El and Adam at Tel-Aviv University). I analyse the attempted and actual productions of *ʁ* during various developmental stages in the subjects (Adam and Bat-El 2008, 2009), counting the deletion, substitution and faithful productions of the *ʁ*s.

Results: The results reported in Ben-David et al. (submitted) were partially replicated in the current study. The following picture of *ʁ* acquisition emerges: *ʁ*s are attempted and produced earlier in coda positions than in onset positions. During the earlier stages, the phenomenon is more pronounced, but later on, the distribution nears that observed in the lexicon. This demonstrates the role of selectivity in early acquisition (for Hebrew: Ben-David 2001:342, Bat-El 2012, Becker 2012, Cohen 2012; for other languages: Drachman 1973, Schwartz and Leonard 1982 to name a few), attempting the coda-*ʁ* forms before the onset-*ʁ* forms. Word-final codas precede word-medial and word-initial *ʁ*s, and consonant-adjacent *ʁ* is the last to be acquired, codas before onsets.

Lexicon analysis vs. acquisition patterns: The following compares the distribution of *ʁ* in Hebrew nouns (Bolozy & Becker 2006) vs. attempted targets in the productions of two infants, SR and RM:

	Initial	Medial Onset	Medial Coda	Final
Lexicon	445	1897	634	818
SR	213	401	184	773
RM	1105	1198	692	1225

Clearly, if frequency played a role in infants' acquisition, word-medial onsets – not word-final codas – would be the most commonly attempted *ʁ*, and the earliest to be produced faithfully.

Discussion: While it has been argued that the more frequently a segment appears in a certain prosodic position, the more rapid its acquisition in this position is (e.g. Zamuner 2003:70), this cannot be a relevant factor in Hebrew *bs*, as onset *bs* are more frequent than coda *bs*. The acoustic input available to the Hebrew acquirers, however, is inconsistent in onsets, while being relatively consistent in codas. The consistency in codas allows for simpler generalisation of the patterns and, subsequently, categorisation of the segment. Phoneme consistency, I argue, biases segmental acquisition, facilitating earlier production of the consistent coda allophones (codas) compared to the inconsistent onsets.

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