

# Default Stress System in Modern Hebrew: a Quantitative Study

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## Abstract

Studies on languages in which the stress is not consistently assigned by rule or prosody (eg. Halle and Vergnaud 1987, Revithiadou 1999, Alderete 2001 on Russian) suggest the existence of a default stress system, which emerges for words which lack “instructions” on how to be stressed. This poster presents an experimental study which explored the existence of such system in Modern Hebrew nouns, which are divided into three stress groups. The speakers were asked to produce nonsense nouns which were controlled for prosody, morphology and resemblance to high/low frequency words. The results showed uniform trends, which suggest an existence of a default stressing system, which is different from the most common stressing pattern.

## Modern Hebrew

### ❖ Noun stress paradigm (Bat-El 1993):

➤ final mobile stress:

*xatúl* ‘cat-MS-SG’      *xatulím* ‘cat-MS-PL’

➤ penultimate mobile stress:

*mélex* ‘king MS-SG’      *melaxím* ‘king MS-PL’

➤ lexical fixed stress:

*tíras* ‘corn-MS-SG’      *tírasim* ‘corn-MS-SG’

### ❖ Lexical distributions (Boložky and Becker 2006):

➤ final mobile stress: **~75%**

➤ penultimate mobile stress: **~2%**

➤ lexical fixed stress: **~23%**

### ❖ Insensitivity to prosody (Bat El 1993, Graf and Ussishkin 1993):

➤ no phonological contrast in vowel length:

[i] [o] [u] [e] [a]

➤ no influence of syllable structure:

*ka.lá* ‘bride’      *ma.kóm* ‘place’  
*sim.lá* ‘dress’      *mis.pár* ‘number’

➤ Stress minimal pairs:

*bi.rá* ‘capital’      *bí.ra* ‘beer’  
*xo.réf* ‘plow-’      *xó.ref* ‘thicket’

### ❖ Suffixation:

➤ C-final stems.

➤ [a] – feminine gender suffix.

### ❖ Prosodic templates and vocalic pattern:

➤ Can indicate semantic properties: **CaCáC** – occupations *nagár* ‘carpenter’, *zamár* ‘singer’. (Berman 1978).

➤ Integral part of speakers’ language knowledge.

### ❖ Gender:

➤ Masculine/feminine.

➤ Marked on nouns, adjectives, numerals.

➤ Agreement between nouns and adjectives/numerals.

## Research Questions

### ❖ Considering that there is no uniform rule for the stress assignment in Hebrew:

➤ Does Hebrew have a default stress assignment system?

➤ What are the factors that are affecting the default stress assignment?

### ❖ Nikolaeva (1971), Crosswhite et al (2003), Fainleib (2008):

➤ Examined the default stress in Russian using nonsense words.

➤ The findings indicated consistent trends, which were also similar between the three studies.

## Experiment

❖ **Participants:** 13 native Hebrew speaking monolinguals, 9 males, 4 females, mean age 23.

❖ **Methodology:** embedding nonsense words in carrier sentences whose syntactic structure implies that the nonsense word is a bare nominal stem → no morphological boundary, masculine gender.

Table 1: nonsense words stem templates:

	2σ	3σ – CV initial	3σ – CVC initial
V-final	CV.CV	CV.CV.CV	CVC.CV.CV
	CVC.CV	CV.CVC.CV	CVC.CVC.CV
C-final	CV.CVC	CV.CV.CVC	CVC.CV.CVC
	CVC.CVC	CV.CVC.CVC	CVC.CVC.CVC

### ❖ Nonsense word control factors:

➤ syllable structure: CV vs CVC to test for potential influence of syllable weight.

➤ number of syllables: to test for alignment of the main stressed foot.

➤ frequency: matching the stem vowels to either high frequency or low frequency vocalic pattern (Boložky and Becker 2006 dictionary).

Table 2: vocalic patterns used in the experiment.

	High Frequency	Low frequency
2σ	ai	ui
	aa	oo
	ao	uu
3σ	aaa	oae
	iao	auu
	aua	iei

➤ morphology: word final segments either matched existing nominal suffixes or were some other segments. The purpose was to test whether V-final words are perceived as having a morpheme boundary despite the bare stem context imposed by the carrier sentence.

Table 3: segments used for morphological control.

		High Frequency	Low Frequency
V-final	suffix	-a (12 words)	-
	not suffix	-i / -o (24 words)	-i / -o / -u / -e (36 words)
C-final	suffix	-on / -it / -an (18 words)	-on / -it / -ut / -et (19 words)
	not suffix	various (18 words)	various (17 words)

❖ **Total number of nonsense stems:** 12 word templates x 6 words in each template x 2 frequency groups = 144.

❖ **Carrier sentences:** one very general carrier sentence was used for all the nonsense words. In order to ensure that the novel word was perceived as a bare stem it was followed by a masculine form of the numeral ‘one’.

#### Example of a stimulus sentence:

*ani roe/roa      rak zasag exad*  
*I see-ms/see-fm only zasag one-ms*

❖ **Procedure:** the stimuli were printed on a A4 paper and arranged in a folder in a random order. The participants were asked to read naturally the whole sentences on each of the 144 pages.

## Results

❖ **Stress distribution counts:** only 6 antepenultimate productions which were not included in the counts.

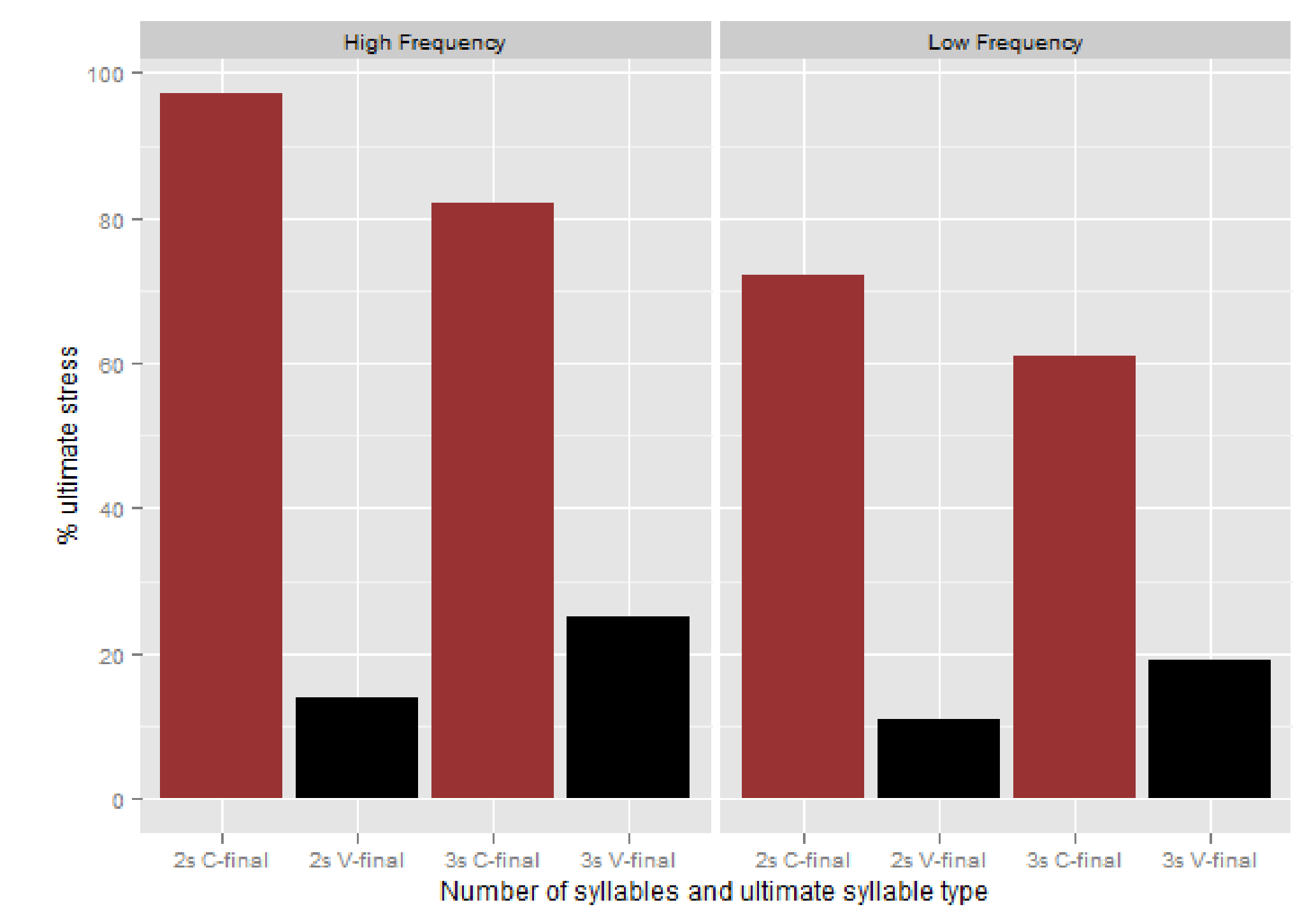


Figure 1: stress distribution by number of syllables and structure of last syllable.

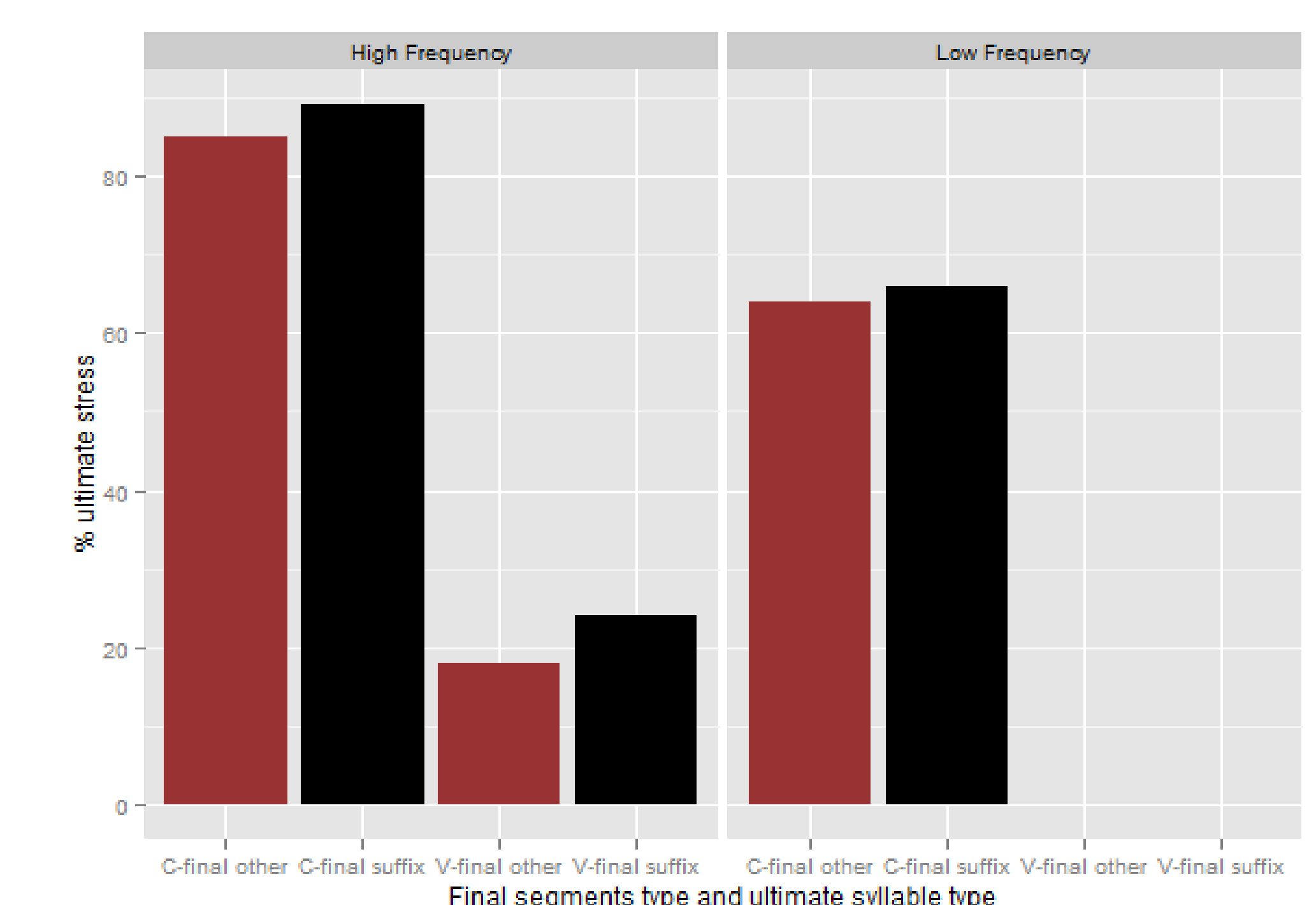


Figure 2: stress distribution by type of word final segments.

❖ **Statistical analysis:** logistic mixed effects model with position of stress as dependent variable; number of syllables, structure of penultimate syllable, structure of ultimate syllable, morphological control, frequency as fixed effects; participants and the ultimate syllable structure as random effects.

**Main effects: ultimate syllable structure and of frequency (p < 0.001 for both).**

## Conclusions

### ❖ Uniform trends in stress assignment:

➤ final in C-final words and penultimate in V-final words.  
➤ stress alignment: right edge of the word.  
➤ no influence of prosody.

### ❖ Different from the existing stress patterns which are not sensitive to the structure of the final syllable.

➤ lack of main effect for morphological control suggests that nonsense words were treated as lacking a morphological boundary.  
➤ identical to the stress pattern found in Hebrew acronym words (Bat-El 1994): in V-final acronym words, the final surface vowel corresponds to an underlying glottal stop.

### ❖ Unmarked patterns:

➤ significantly higher amounts of ultimate stress for high frequency words resembling stimuli suggest stressing in analogy to existing words.  
➤ greater tendency for penultimate stress in words that resemble the less frequent ones suggests that trochaic stress is the pattern that emerges by default – emergence of the unmarked (McCarthy and Prince 1994).  
➤ evidence from Hebrew language acquisition (Ben-David 2001, Adam and Bat-El 2007, Levinger-Gottlieb) show that trochaic stress is the one that emerges initially before the lexical distributions are acquired.

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