

Distinctive features and articulatory gestures in Hadza

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Hadza (Khoesan) has several clicks in its phonological inventory. Sands, Maddieson & Ladefoged (1996) and Sands (2013) describe Hadza with 9 clicks while Miller (2008) suggests that there are 12. The 4 types of Hadza clicks [⦿, |, !, ||] bilabial, dental, alveolar and lateral can be accompanied, in a contrastive way, by aspirated, glottal and nasal features [⦿, |?, |^h, ʋ|, ʋ|?, !?, !^h, ʋ!, ʋ!?, ||, ||^h, ʋ||^h, ʋ||?]. From an acoustic point of view, clicks can be described with 2 features [grave vs. acute] and [abrupt vs. noisy] following a proposal made by Traill (1994).

In order to describe Hadza clicks in terms of gestures (with a measure of time) and to establish the relevant distinctive features, 4 women and 5 men native speakers were recorded using various instrumental techniques (Aerodynamic, acoustic, EGG, palatographic and Video).

Some of the results show that there is a difference between the apical clicks [|, !] and the lateral click [||] where the tongue blade extends backwards during production before the release. This back of the tongue movement is slower for aspirated clicks compared to non-aspirated ones. For noisy clicks, after releasing the anterior closure, there is an initial increase in loudness that increases to a peak and then decreases. It is a measure of how quickly the anterior part of the tongue moves away from its place of articulation. The back of the tongue moves away more slowly from the velum with the aspirated clicks compared to the non-aspirated ones. All the segments discussed here require accounting very precisely for the relative coordination of articulatory movements, the adjustments of the larynx and the movements of the velum. These coordination specifications are not directly related (one to one) with the phonological features. Table 1 summarizes these observations.

Table 1. Articulatory and acoustic features of Hadza clicks

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Articulatory description				
⦿		!		
labial	laminal	apical	apical-alv.	
	Dental	alveolar	lateral	
Acoustic description				
		grave		
		!		
	abrupt			noisy
		acute		

Miller, K. (2008). *Hadza grammar notes*. Ms Riezlern.

Sands, B. (2013). Phonetics and Phonology: Hadza. In R. Vössen (Ed.). *The Khoesan languages*. London. Routledge.

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