Phonological contrasts and gradient effects in ongoing lenition

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The Spanish of Gran Canaria presents advanced weakening of stops that leads to 1) the voicing, approximantisation and even deletion of post-vocalic /p t k/, and 2) approximantisation and deletion of post-vocalic /b d g/. The outputs of these changes partially overlap and depend on a series of phonological, phonetic and demographic factors. Most importantly, the deletion of a preceding consonant, which makes the resultant post-vocalic context derived rather than underlying, has an effect on the degree of aperture of the target sound. This adds additional complexity to the distribution of surface forms in the dialect. The table below presents the range of possible pronunciations of underlying /p b/ (with /t d k g/ following a similar pattern).

UR	Example	voiceless stop	voiced stop	approximant	Ø
/p/	*guapo* 'pretty'	[gwá.po]	[gwá.bo]	[gwá.β̞o]	[gwá.o]
	se parece 'is similar'	[se.pa.ɾé.se]	[se.ba.ɾé.se]	[se.β̞a.ɾé.se]	[se.a.ɾé.se]
	después 'afterwards'	[de.pwé]	[de.bwé]	[de.β̞wé]	
/b/	*abuela* 'grandma'			[a.β̞wéla]	[a.wéla]
	la vela 'the candle'		[la.bé.la]	[la.β̞éla]	[la.éla]
	las velas 'the candles'	[la.pé.la]	[la.bé.la]	[la.β̞éla]	

This study explores a large corpus of 16,474 post-vocalic /p t k b d g/ produced by 44 native speakers from Gran Canaria by looking at three phonetic parameters: harmonics-to-noise ratio, relative duration and intensity difference. We also look at general frequency and degree of lenition, taking into account prosodic and positional effects, phonetic context and social factors. The aim was to classify surface pronunciations into systematically produced variants based on the phonetic parameters associated with lenition and point to the importance of gradient phonetic effects for contrast preservation. The results show a path of gradual sound shortening and opening with the advancement of weakening, from voiceless stops to open approximants, as well as systematic use of 6 different variants depending on the underlying representation and on the phonological context. More specifically, we have identified two types of [p t k], two types of [b d g] and two types of [β̞ ð̞ ɣ] that differ in the degree of aperture (see Fig. 1). We propose that these changes should be treated as continuity lenition (Katz 2016) leading to the flattening of the intensity contour and of the harmonicity profile of the target segment with respect to the flanking sounds. We also provide evidence that harmonics-to-noise ratio can be successfully used to predict lenition degree, which is a new finding. Given systematic contrast preservation in the data, we argue that traditional featural distinctions based on voicing and continuancy are insufficient to address weakening phonologically and a scalar feature [aperture] should be adopted instead.

Fig. 1. Six surface variants of underlying /p t k b d g/ identified in the study (intensity difference marks aperture).