Different dark and light /l/s: English & Georgian

The temporal coordination of articulatory gestures has received much attention in recent literature (e.g. Browman & Goldstein 1986, 1988, 1989, 1995, Sproat & Fujimura 1993, Wood 1996, Krakow 1999). In seminal work, Sproat & Fujimura (1993) demonstrated that English [l] contains two critical gestures, one involving backing and raising of the tongue dorsum and the other involving raising the tongue tip. These gestures are temporally coordinated in onsets, while in codas the movement of the tongue dorsum clearly precedes that of the tongue tip, with the dorsum attaining its goal at approximately the same time that the tip begins its movement. These works have led to the hypothesis that this type of differential temporal coordination is a hallmark of the onset/coda distinction.

Another language with “dark” and “light” /l/ allophones is Georgian. Unlike English, where the allophones are determined by syllabic position, the conditioning factor in Georgian is the following segment. The light allophone occurs when the following segment is a front vowel, [e] or [i] (1a); otherwise the /l/ is dark – in codas (1b), in clusters (1c), and in onsets preceding back vowels (1d). Of interest is understanding how the dark/light contrast is achieved in Georgian. One possibility is that the distinction results from differential temporal coordination despite it not being syllabically conditioned. Another possibility is that the distinction is achieved in some other way, giving rise to alternative ways to achieve either dark or light /l/, or both.

In this pilot study, we imaged words of the four types shown in figure 1 in the speech of one speaker of Georgian. With respect to dark [l], our images show that dark [l] involves raising and backing of the dorsum and a slight coronal raising. Furthermore, the dorsal gesture is completed before the onset of the coronal gesture. These properties are illustrated in figure 2, which shows the shape of the tongue surface during the word [lamazad]. The dorsal gesture (brown/red towards the top in frames 3–6) clearly precedes the tongue tip gesture (yellow/green towards the bottom in frames 6–9).

By contrast, the light [l] involves a single domed gesture, similar to that of the vowel [e], with no dorsum raising or backing. Figure 3 shows the tongue surface during the word [vxlEÙ], with a single gesture in the palatal region (orange/yellow in frames 7–10).

There are two conclusions to be drawn. First, the dark/light contrast in laterals can be achieved in multiple ways. In particular, light /l/ need not include a dorsal gesture. Second, while temporal coordination of gestures appears to mark a distinction between onsets and codas in some languages (e.g. English /l/, Sproat & Fujimura 1993), this is not the case for similar segments in other languages, such as Georgian.
Figure 1: Examples of Georgian light and dark /l/

| light [l] | vxlec ‘I spit’  
exeli ‘hand’ |
| dark [l] | ert xe1 ‘once’  
xena ‘joy’  
xenad ‘prettily’  
saxsi ‘at home’  
supe’a ‘butterfly’ |

Figures 2 and 3 synchronize a linguagram, amplitude, and a spectrogram. Each vertical line (“frame”) in the linguagram represents a single tongue trace, with the earliest time at the left and with the back of the tongue towards the top of the page and the tip towards the bottom. Every fifth frame (vertical line) is numbered.

Figure 2: Back [l] in lamazad ‘prettily’. There is a dorsal gesture preceding the tongue tip gesture. The tongue dorsum gesture is apparent in frames 3-6 and the tongue tip gesture in frames 6-9.
Figure 3: **Front [l] in [vxletʃ] ‘I spit’**. There is a single domed gesture between frames 7–10.