Two cases of vowel weakening in Brazilian Portuguese: an ultrasound study

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This paper aims to investigate two processes of vowel reduction in Brazilian Portuguese (BP), often called 'deletion'. The first process is the so-called apocope of high vowels, which results in the absence of the high vowel in word final position. The second process is vowel sandhi elision at word boundaries in BP. In order to explore the nature of these processes, we designed an automated process for registering relatively large-magnitude deformations in the horizontal and vertical dimensions of sagittal ultrasound images of the tongue, based loosely on an algorithm described by Moisik et al (2013). Three lingual regions of interest were delineated, corresponding to the range of motion of the "front", "mid", and "back" of the tongue. Velocity functions for each region were logged and visualized in R using customized SSANOVA. As to devoicing, our results are consistent with the hypotheses that vowels are not deleted, but overlapped by the preceding consonant. In sandhi, extreme reduction is triggered by increasing the speech rate. At fast speech rates, the first vowel appears to become reduced and hidden by the high vowel gesture. Both sandhi and devoicing in BP seem to result from reorganization of timing and articulatory targets.