

## **MRI videos**

The video clips of movements of the tongue and lips in the articulation of short phrases were gathered by a procedure known as gated MRI, video MRI or stroboscopic MRI. This is a procedure normally used to image the heart as it beats. It gives excellent image quality and a high frame rate but it has the drawback that the subject must repeat the utterance 18-20 times to the beat of a metronome. The more precisely the subject repeats the phrase, the better the final image quality will be. The procedure starts with a short pre-MRI training session to get the subject used to the sentences and the metronome.

The outcome is a series of 68 frames, showing a sagittal section of the head, which can then be converted to video. Because the procedure involves a number of repetitions gated between metronome beats it is circular; thus the beginning of a phrase shows up not at the first of the 68 frames but at a place that varies from phrase to phrase. The frames have to be carefully inspected to identify this beginning, though subjects usually place the first accented syllable of the phrase on the metronome beat. Thus, the first frame usually shows the vowel in that syllable and the last frame wraps around into that same vowel.

Because the repetitions are circular, there may be regressive and anticipatory influences between the end and the beginning of a phrase. (Some of the phrases were spoken with a pause between the end and the beginning of the next repetition, but not all of them.) Hence a number of frames showing such assimilation have to be discarded at the boundary. Once the sequence of frames has been treated in this way it can then be converted to video.

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Note: in videos 14 and 15 the speaker pronounces “a”, the definite article, with its full form [eɪ].

