



Speech Resynthesis with FDA

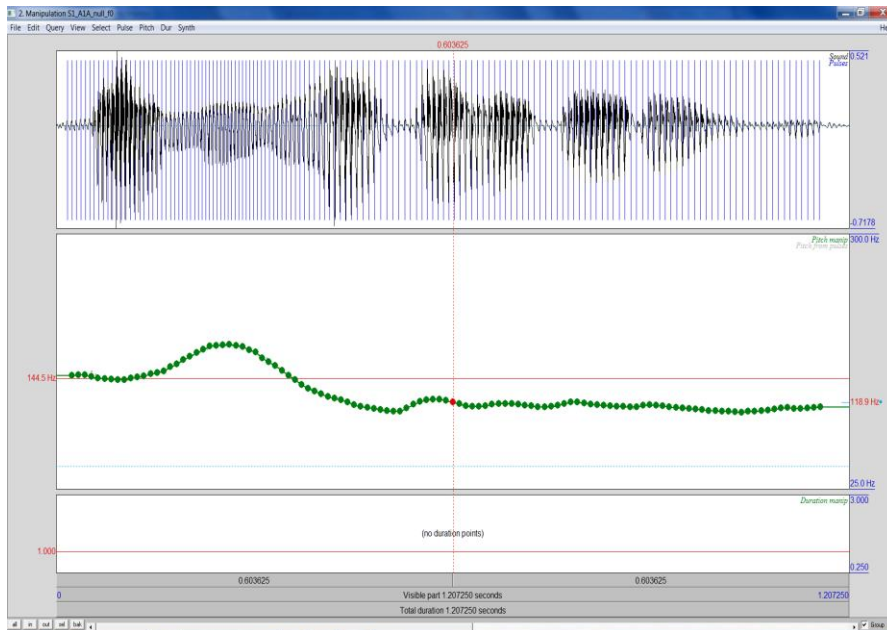
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Perceptual experiments

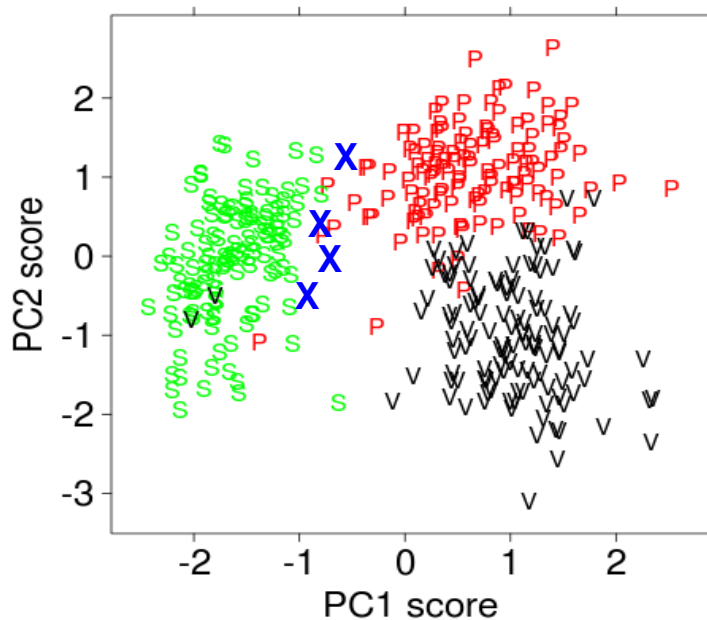
- What are the intonation cues that listeners use to distinguish categories?
- In perceptual experiments we ask listeners to judge stimuli whose f_0 , velocity, intensity contours have been modified
- How to modify stimuli?
 - 1) extract f_0 , velocity, intensity contours from speech ✓
 - 2) modify contours ?
 - 3) re-synthesize speech ✓

Too much freedom



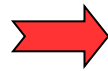
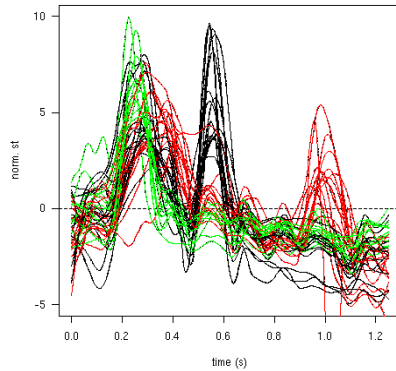
- A resynthesis tool (e.g. PSOLA) allows you to modify f_0 , velocity and intensity in virtually infinite possible ways
- We modify contour shapes according to intonational models, experience and trial and error

Functional PCA as a guide

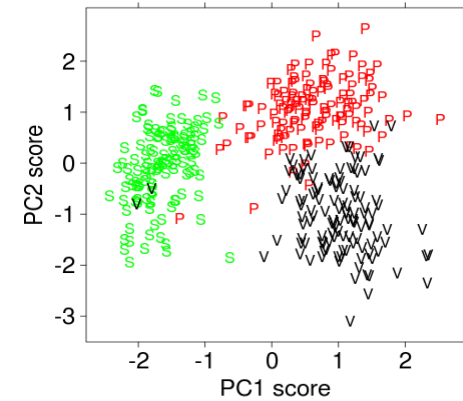
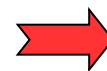


- Functional PCA is a numerical summary of the main shape variations in a contour dataset
- It tells us where category boundaries are in the PC space
- Producing new contours from boundary areas may provide the 'right' ambiguous stimuli

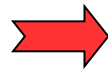
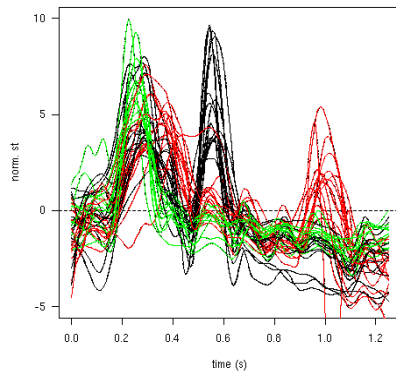
Functional Data Analysis



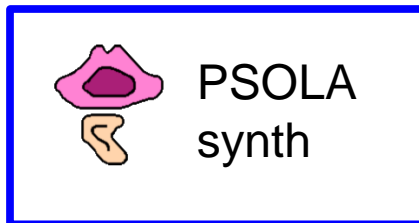
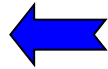
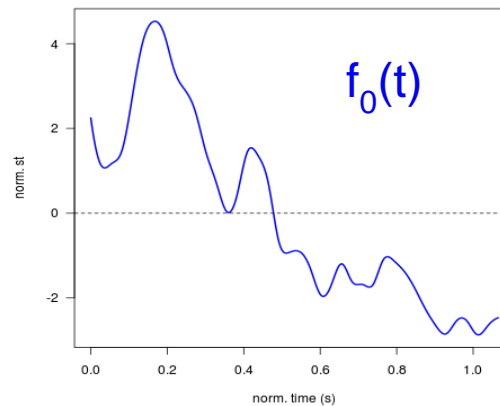
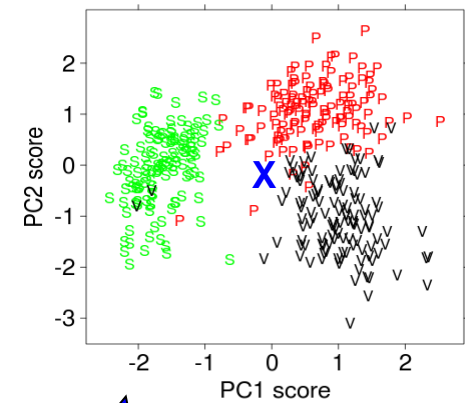
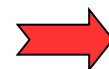
Functional
Data
Analysis



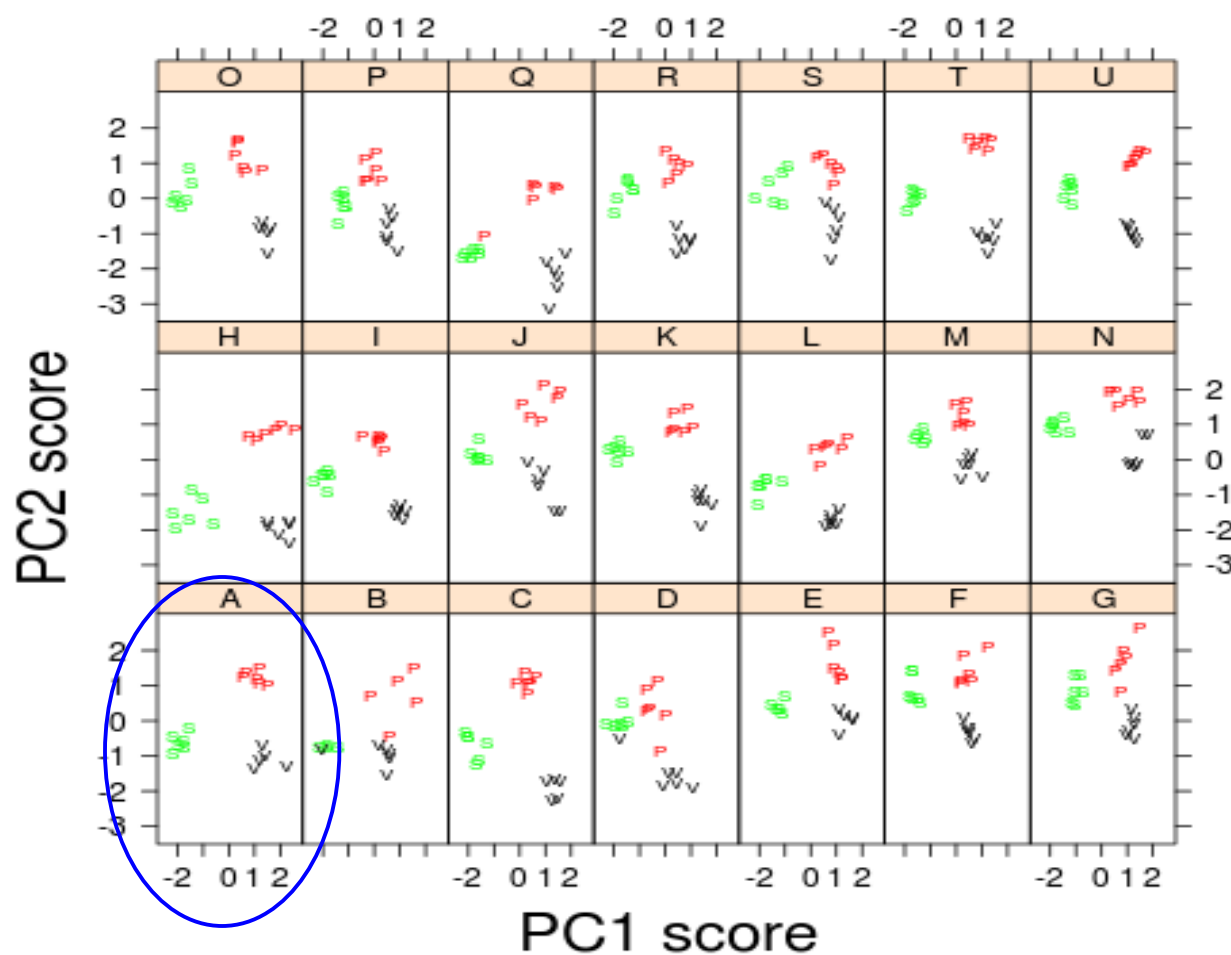
Functional Data Synthesis



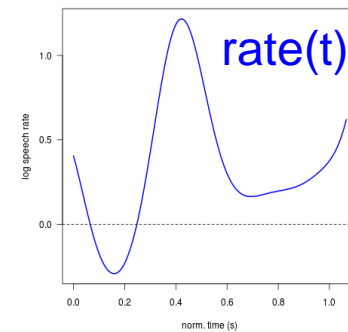
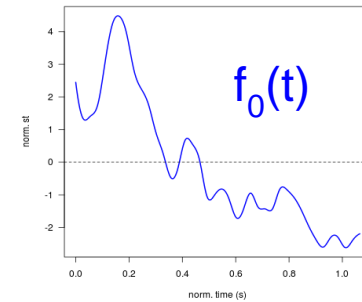
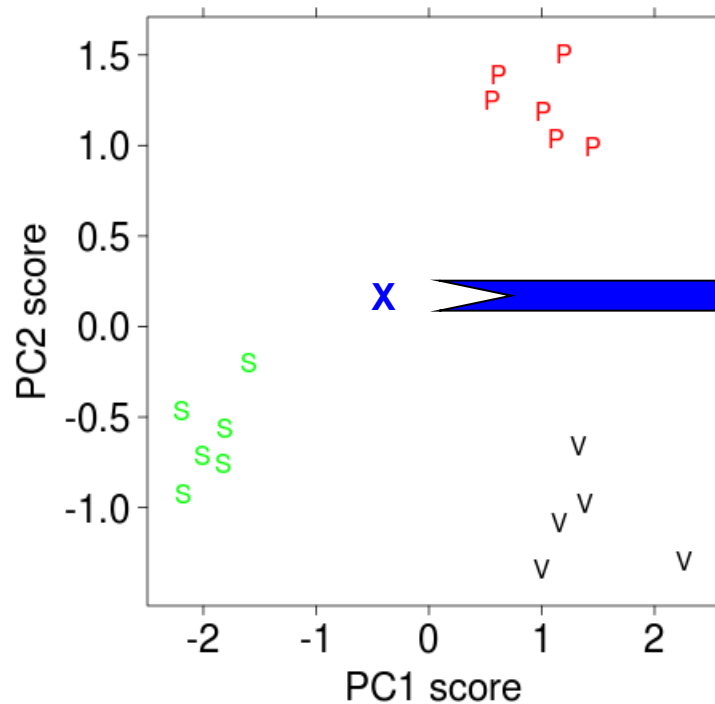
Functional
Data
Analysis



PC scores by speaker

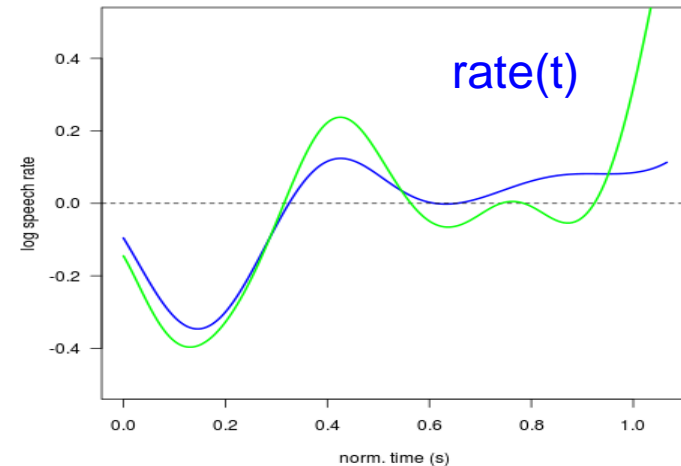
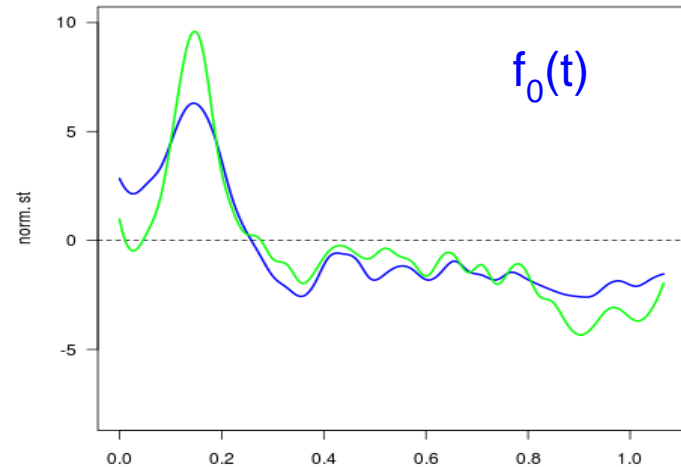
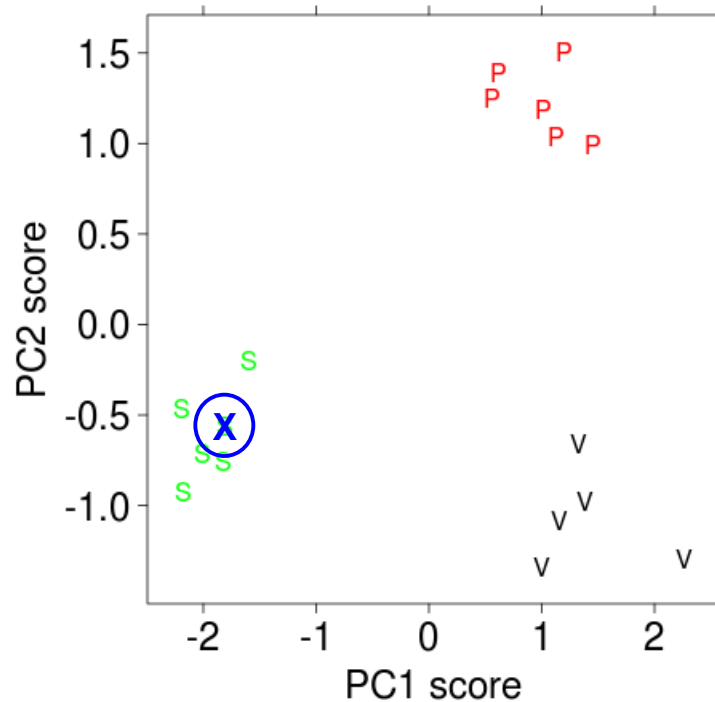


PC-based resynthesis

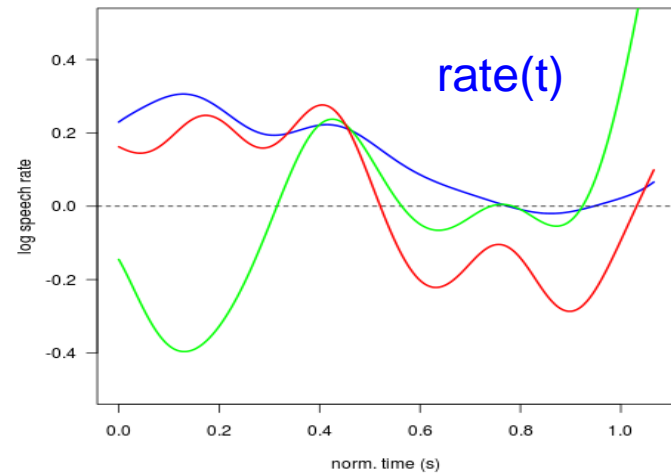
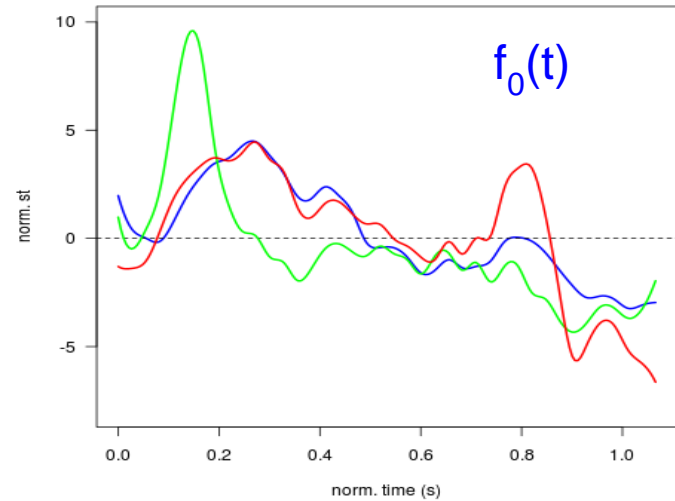
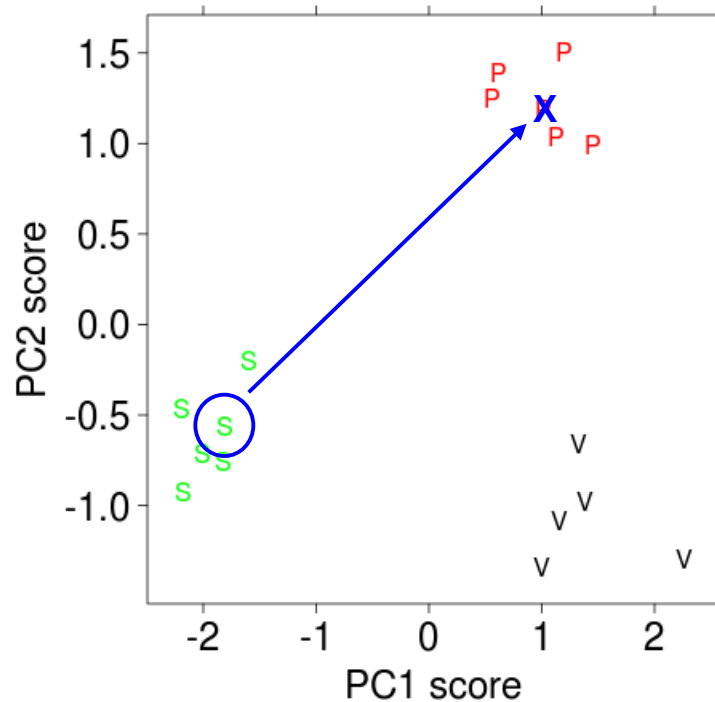


OUTPUT ELEMENT

PC-based reconstruction



PC-based transformation



PC-based transformation

