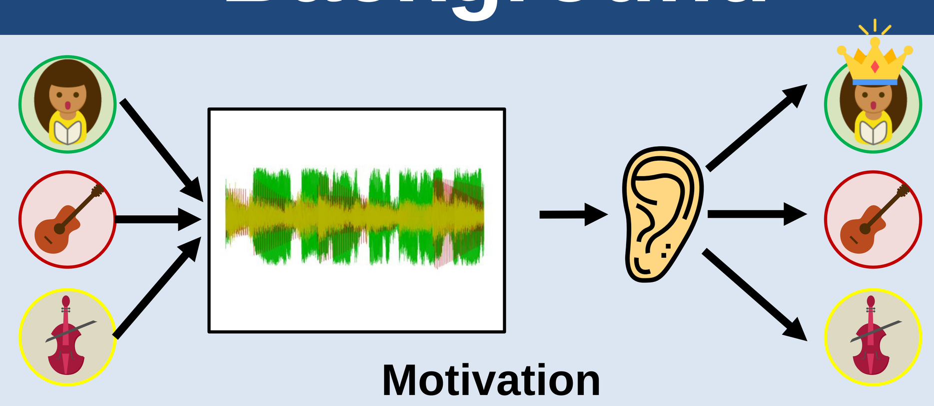
Autotune kills the radio star: Salience of frequency micro-modulations in popular music

Michel Bürgel, Kai Siedenburg
Dept. of Medical Physics and Acoustics,
Carl von Ossietzky University of Oldenburg

CARL VON OSSIETZKY universität OLDENBURG

FREIGEIST

Background



Motivation

Singing voices attract auditory attention in musical mixtures unlike other sound sources

Our Aims

Investigate features of the lead vocals that help it becoming the star of the musical scene.

Vocal melody: replacing the vocals with instruments playing the same melody
Phonological features: replacing the vocals with a pitch-quantized counterpart
Frequency micro-modulations (FMM): adding the frequency modulations inherent in singing voices, to pitch-quantized vocals or instruments replacing the vocals

Conclusion

Vocal salience:
Differences between orders were distinctive for all targets except lead vocals
- Vocals are focused by auditory attention even when no target cue is presented

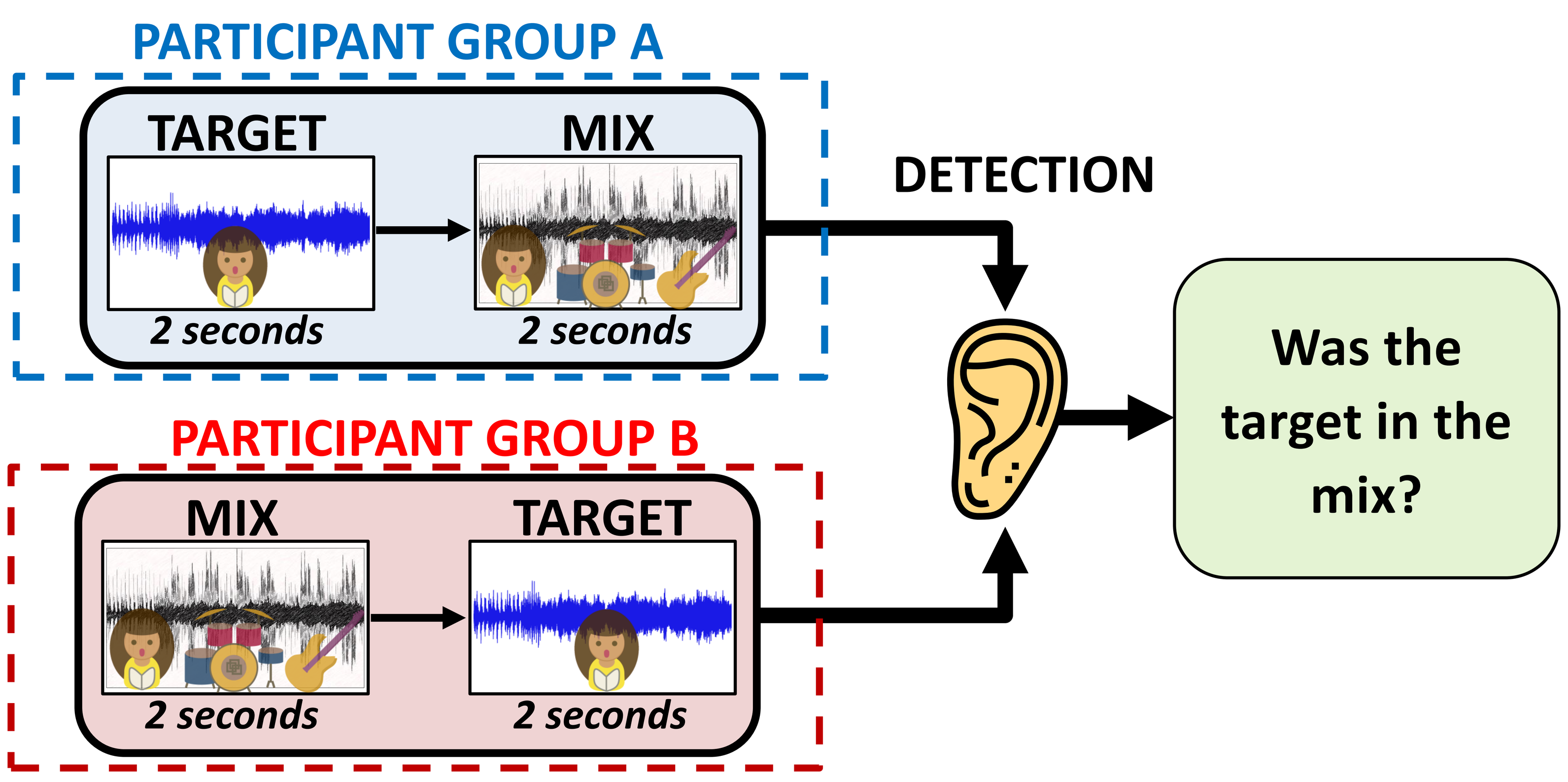
Vocal Melody:
Facilitated detection for vocal melody targets, but order effect persisted
- Main melody does not drive vocal salience

Phonologic features:
Pitch-quantization of the vocals caused an order effect
- Phonlogical attributes do not drive vocal salience
- Excessive pitch correction strips vocals of unique features that makes the voice a focal point of musical scenes

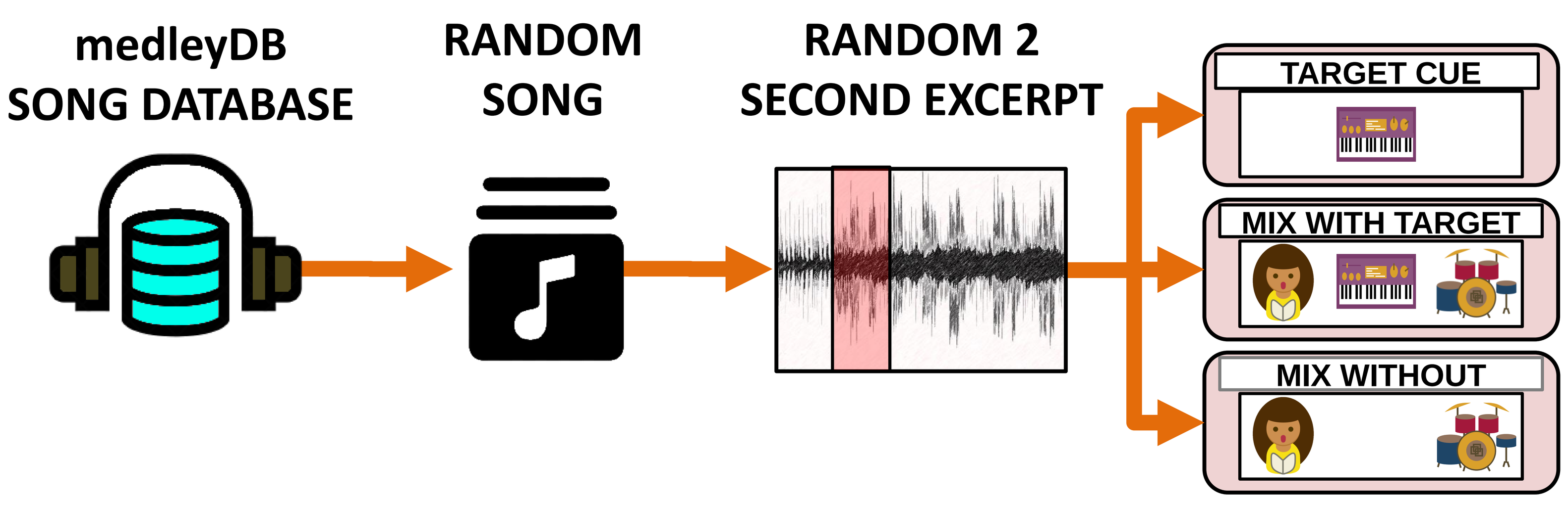
Frequency micro-modulations:
Differences between presentation orders decreased considerably when FMM were transfered to instrument or autotune targets
- FMM caused by the imperfect pitch regulation in singing provide vocals with a unique feature, which helps them to be perceived at the foreground

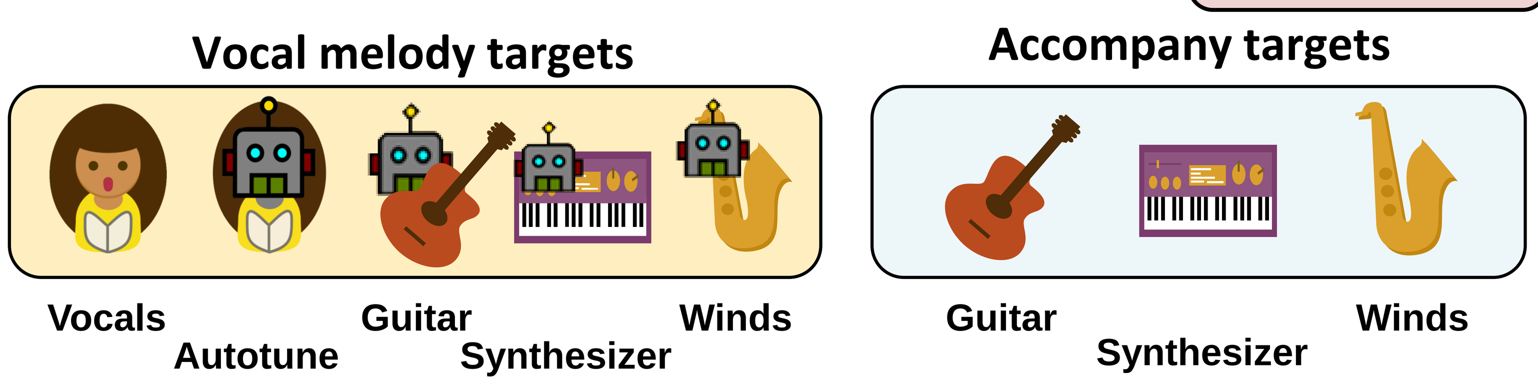
Methods

Experimental task

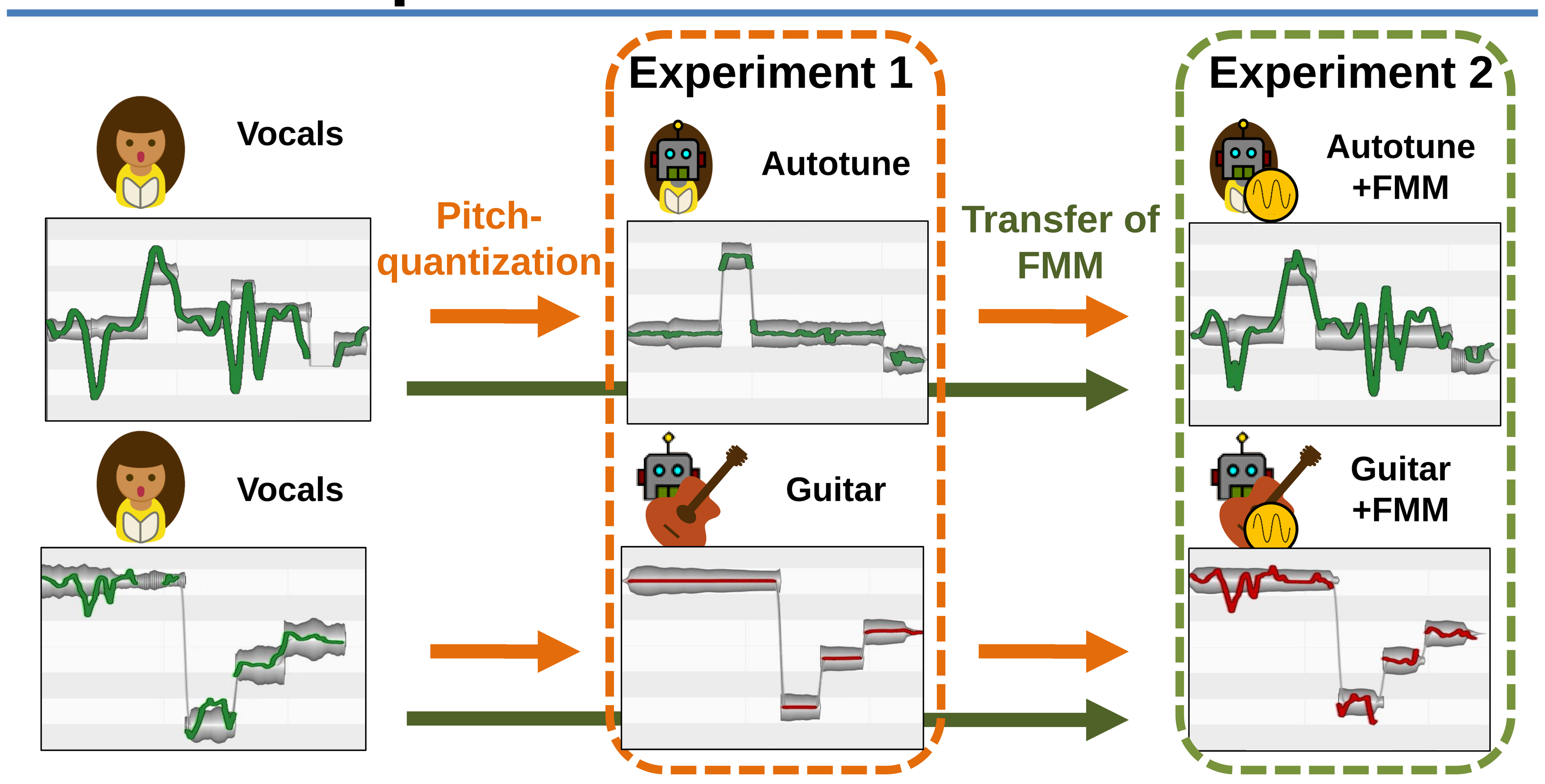


Stimuli & target categories



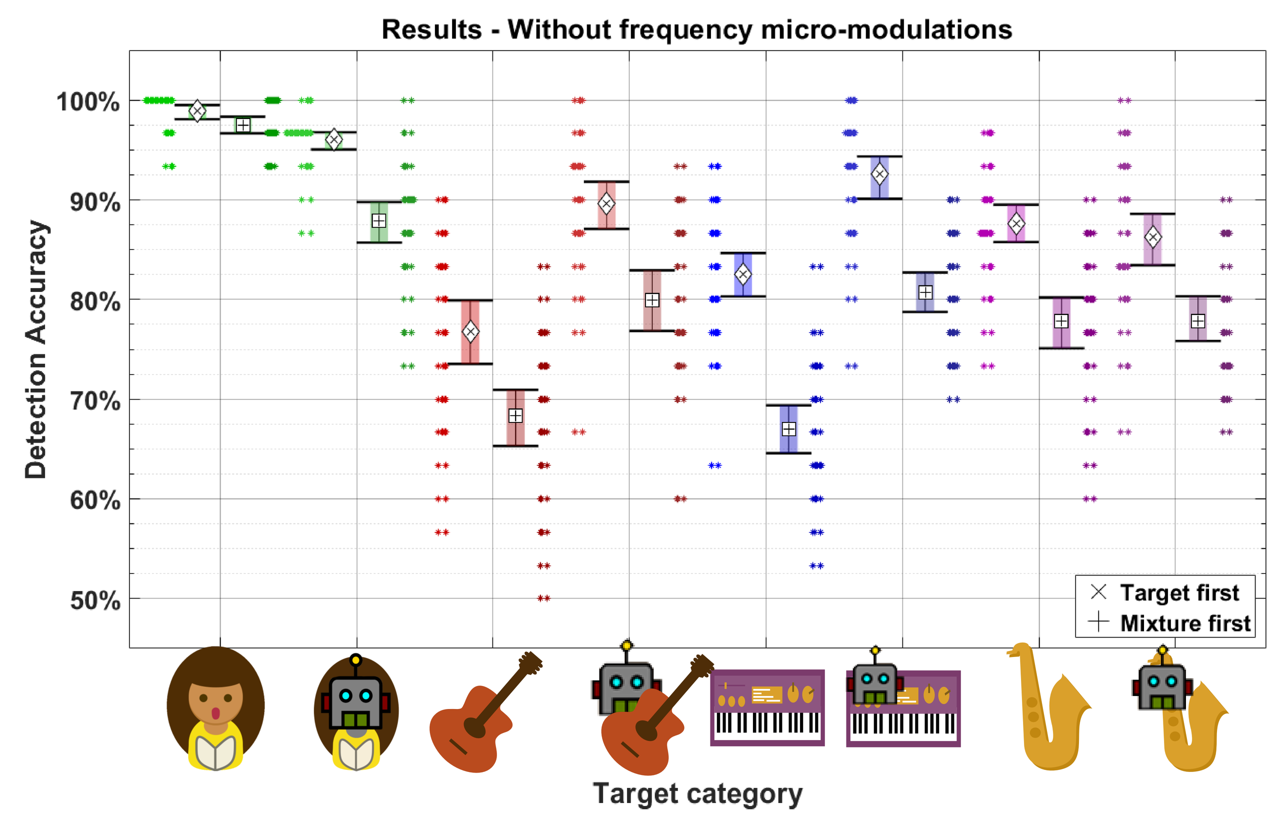


Vocal manipulations



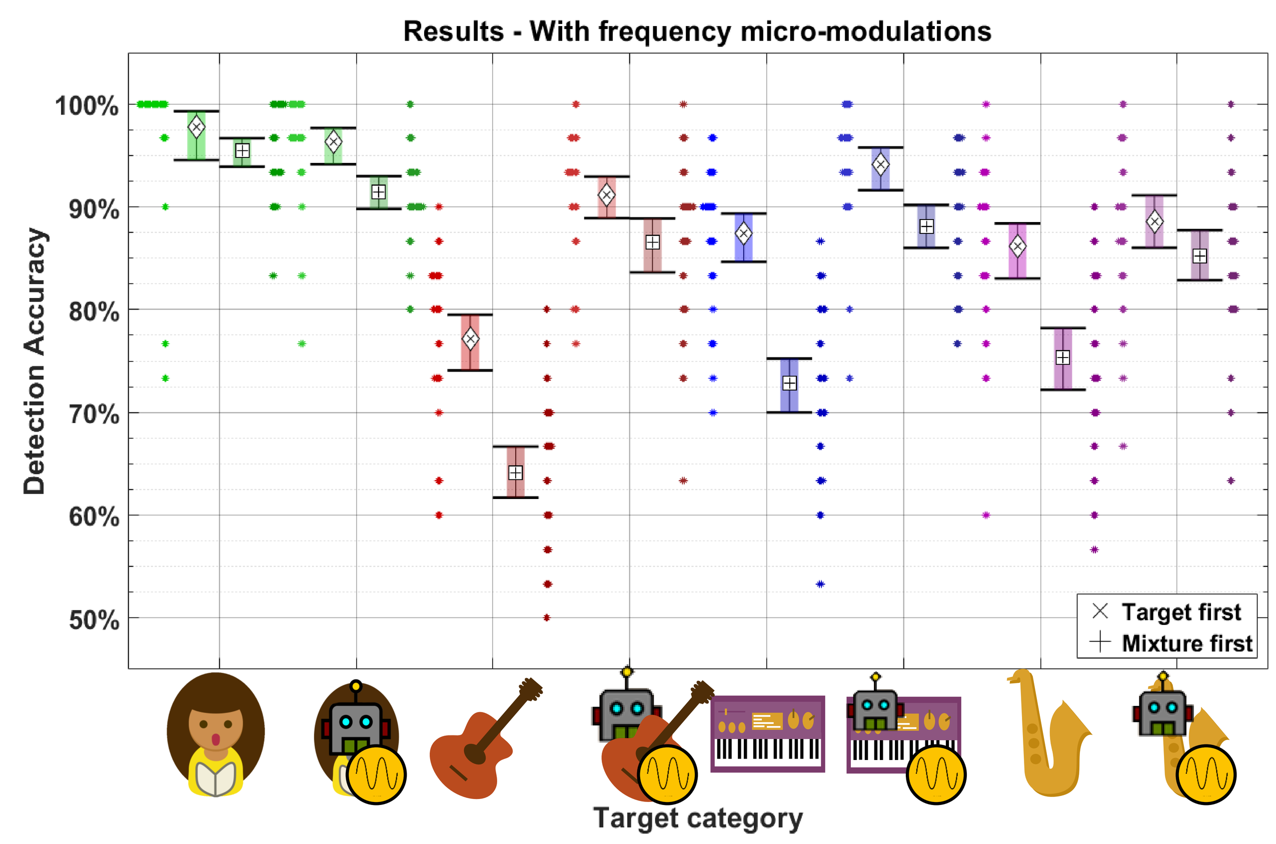
Results

Experiment 1



Participants
66 normal hearing
age: 25.1 (σ = 3.2)

Experiment 2



Participants
67 normal hearing
age: 24.7 (σ = 3.3)

Influence of frequency micro-modulations