# Pitch perception of concurrent high-frequency complex tones

Daniel Guest, Andrew Oxenham

University of Minnesota, Department of Psychology, Auditory Perception and Cognition Lab

## Introduction

- Accurate pitch perception is possible for harmonic complex tones (HCTs) even when all components are beyond putative limits of phase locking [3, 2]
- Accurate pitch perception is possible for target HCTs presented concurrently with spectrally overlapping masker HCTs [1, 4, 6, 5]
- However, it is unknown whether accurate pitch perception is possible for mixtures of HCTs with resolved harmonics beyond the limits of phase locking

## Methods

- Examined pitch perception of complex tones with low (280 Hz) or high (1400 Hz) nominal F0s
- **Experiment 1**
  - Measured F0 difference limens (F0DLs)
  - *Experiment 1a*
  - *Experiment 1b*
- **Experiment 2**
  - Measured percent correct for fixed interval size
- **Experiment 3**
  - Measured target-to-masker ratio (TMR) required for fixed performance and fixed interval size

## Stimuli

## Bibliography

[1] Robert P. Carlyon. "Encoding the fundamental frequency of a complex tone in the presence of a spectrally overlapping masker". In: *The Journal of the Acoustical Society of America* 99.1 (1996), pp. 517–524. DOI: 10.1121/1.41510.

[2] Hedwig E. Gockel and Robert P. Carlyon. "Detection of mistuning in harmonic complex tones at high frequencies". In: *Acta Acustica* 104.5 (2018), pp. 766–769. DOI: 10.3813/AAA.919219.

[3] Bonnie K. Lau, Anahita H. Mehta, and Andrew J. Oxenham. "Super-optimal perceptual integration suggests a place-based representation of pitch at high frequencies". In: *The Journal of Neuroscience* (2017). DOI: 10.1523/JNEUROSCI.1507-17.2017.

[4] Christophe Micheyl, Michael V. Keebler, and Andrew J. Oxenham. "Pitch perception for mixtures of spectrally overlapping harmonic complex tones". In: *The Journal of the Acoustical Society of America* 128.1 (2010), pp. 257–269. DOI: 10.1121/1.3372751.

[5] Christophe Micheyl et al. "Influence of musical and psychoacoustical training on pitch discrimination". In: *Hearing Research* 219 (2006), pp. 36–47. DOI: 10.1016/j.heares.2006.05.004.

[6] Jian Wang et al. "Pitch perception of concurrent harmonic tones with overlapping spectra". In: *The Journal of the Acoustical Society of America* 132.1 (2012), pp. 339–356.