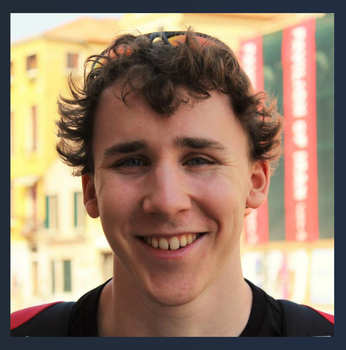

Neural Correlates of Crossmodal Correspondence Between Pitch and Visual Motion

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What Are We Studying?

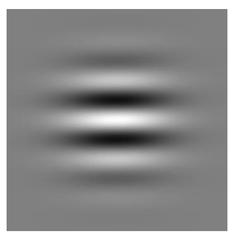
Background:

- Multisensory integration occurs almost every second in the brain. Crossmodal correspondence offers a unique way to study these processes
- Vision usually dominates over audition, however, the reverse is possible – Maeda et al. (2004) first reported an illusion whereby auditory stimuli with no apparent spatial or movement information altered human visual motion perception
- Using superimposed gratings accompanied by ascending or descending pitches, they showed that humans had a bias for perceiving motion in the direction of the pitch glide

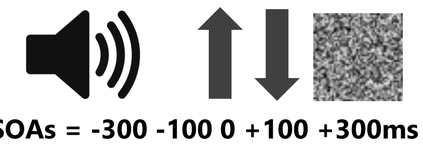
Our Aim: To verify whether visual motion perception can be biased by changes in pitch, and if so, to investigate the neural correlates underpinning this effect

Methods

Experiment 1: Pitch

1. 

Moving Gabor patches of 400ms with ambiguous up/down motion are presented

2. 

Broadband, ascending, or **descending** pitches of 200ms are presented concurrently at **5 different SOAs**

3. Up or Down?

Participants indicate via an **2AFC task** whether they saw the movement as more upwards or downwards

Experiment 2: Speech

Pitches replaced with the spoken words: **"Up"**, **"Down"**, **"Ue"**, and **"Shita"** (up/down in Japanese)

Auditory stimuli are presented without delay

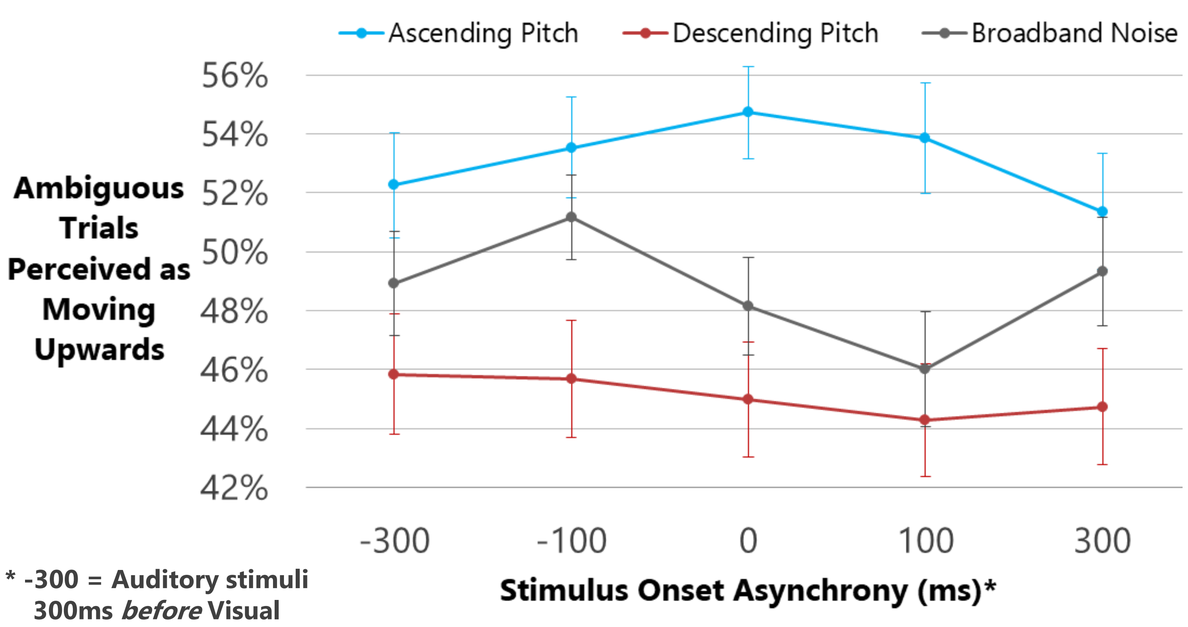
EEG and Behavioural Data

64 electrode EEG recording and follow-up ERP, source localisation, and time-frequency analyses

Statistical analysis of behavioural data with 100 trials per condition and sample size, **N = 30**

Preliminary Results

Experiment 1

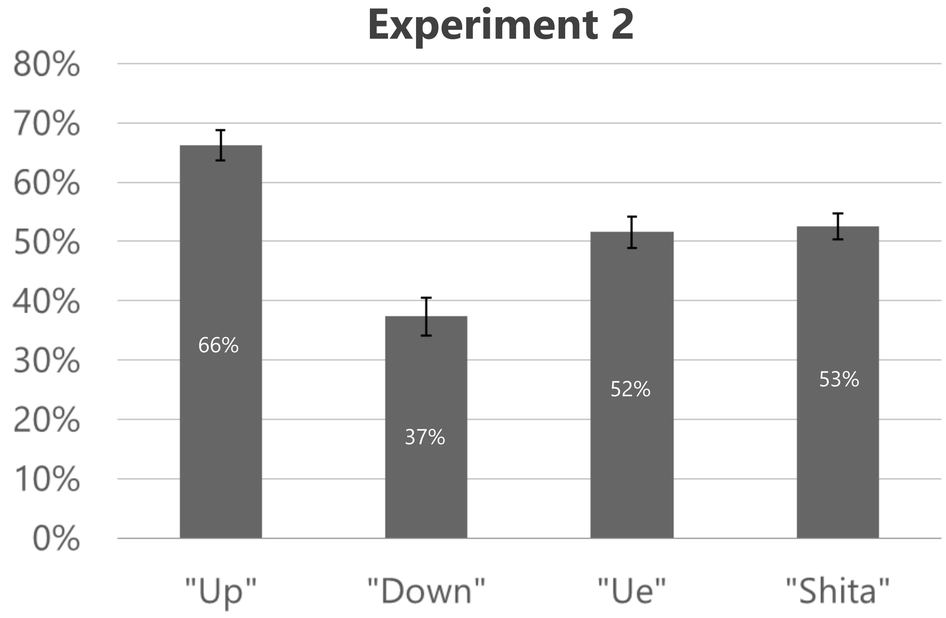


* -300 = Auditory stimuli 300ms *before* Visual

Significant difference between auditory congruent and auditory incongruent visual perception across all SOAs ($p<0.01$)

- **Perceptual information in the auditory stimulus (such as pitch content) is enough to alter human judgement of visual motion**

Experiment 2



Bias towards perceiving upwards motion when hearing the word "Up" (**66%**) and bias against when hearing "Down" (**37%**)

Japanese control words show perception at around chance level

- **Semantic information in auditory stimuli adds to the effect in Experiment 1, amplifying the visual motion perception bias**

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