

## Introduction

Complex emotions involving more than one basic emotion are frequent occurrences in many everyday social situations. The present research will focus on the perception of mixed happy-sad emotions, that is, the co-occurrence of two core emotions of opposite valence.

The aim is to examine the vocal expression cues (pitch and tempo) that evoke the perception of mixed emotions. We are also interested in studying how the content of sentences affect the perception of emotions from vocal expression cues.

In Western music, emotions are reliably elicited by combinations of mode and tempo, and these cues enable mixed-emotions to occur as an integrated experience (Poon & Schutz, 2015). Similarly in speech, the combination of pitch height and tempo reliably elicit happy and sad emotion (Scherer, 1995).

We predict that the occurrence of conflicting combinations of these cues will elicit mixed-emotions according to the following combinations:

		Tempo	
		Fast	Slow
Pitch	High	Happy	Mixed
	Low	Mixed	Sad

We will examine how ratings of happiness and sadness are influenced by the combination of vocal prosodic cues and sentence content.

We will also examine the processing of mixed emotions by measuring the pattern of eye gaze responses of participants watching video recordings of expressive speech spoken by a female talker.

## Methods

### Experiment 1

**Participants:** 20 undergraduate students with normal hearing and vision

**Stimuli:** Audio recordings of sentence-length speech

- 96 sentences (12 sentences x 4 emotion conditions x 2 sentence conditions), randomly presented

**Response:** Following each trial, participants will rate the sample on happiness and sadness using two independent 7-point Likert scales

### Experiment 2

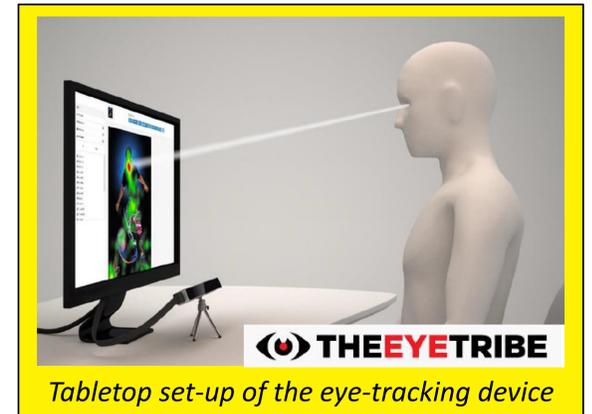
**Participants:** 20 undergraduate students with normal hearing and vision

**Stimuli:** Audiovisual recording of paragraph-length speech

- 40 stimuli (10 stimuli x 4 emotion), randomly presented

**Response:** The Eye Tribe eye-tracking device will be used to measure participants' eye gaze patterns as they watch videos of expressive speech.

Following each sample, participants will rate the sample on happiness and sadness using a 7-point Likert scales.



## Expected Results

### Experiment 1

Predictions:

- When tempo and pitch are paired in ways that are consistent with happy and sad expression in speech, listeners will rate the expressions in accordance with those emotions
- When voice cues are paired in conflict, they will result in intermediate ratings between those of pure happy and sad emotion ratings.

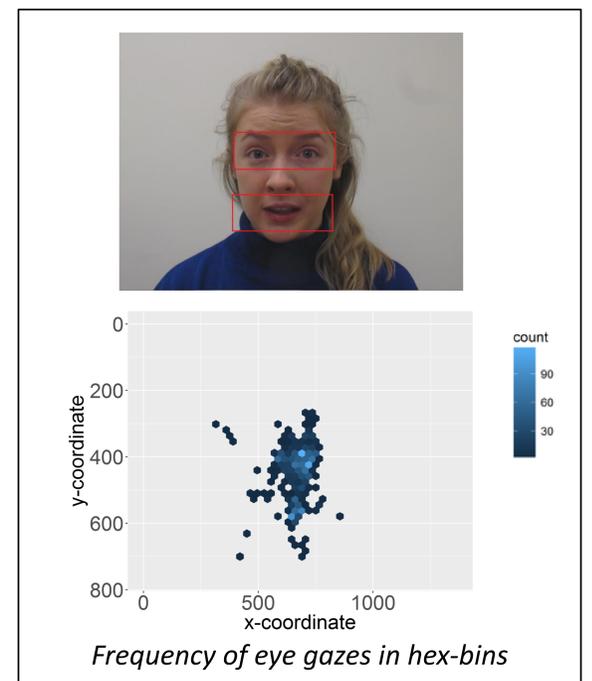
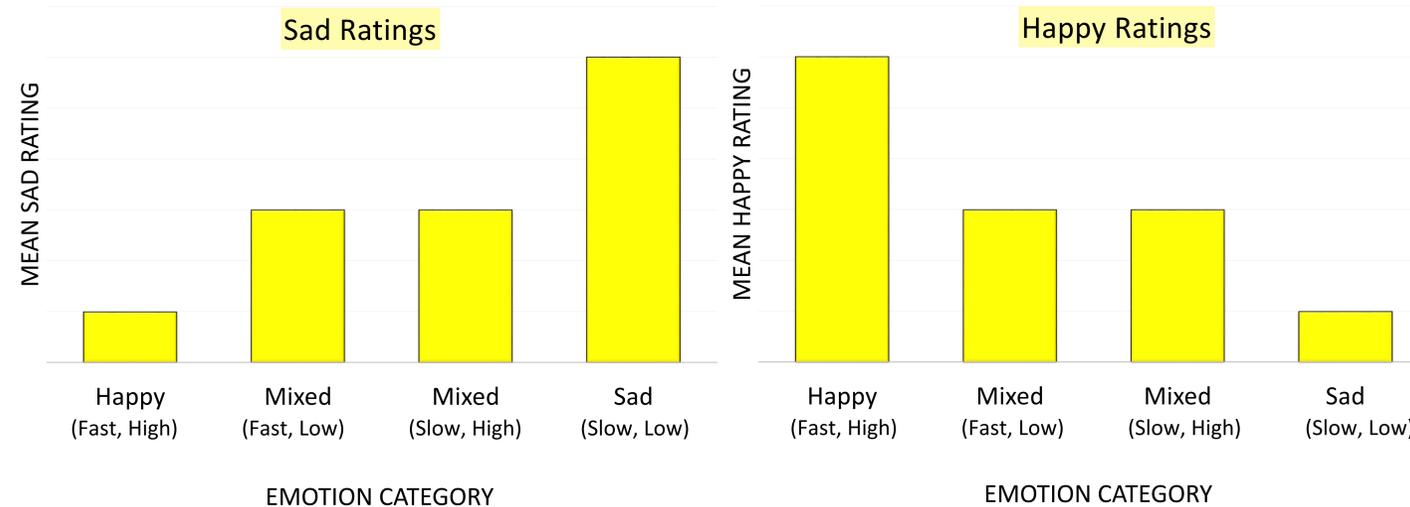
- The addition of sentence content that meaningfully describes emotions (semantics) will reduce the perception of mixed happy-sad emotions evoked in vocal expressions

- With the addition of meaningful semantic content, we expect the pattern of emotion ratings and visual responses to vary less under the influence of prosodic cues.

### Experiment 2

Predictions:

- The same emotion rating results as those expected in experiment one
- Visual responses are expected to be shorter in the interpretation of purely happy and sad emotions
- Visual responses are expected to be longer in the interpretation of mixed happy-sad emotions



## Conclusions

- Our findings are expected to increase our understanding of the perceptual experience of complex emotions in speech
- They may help to confirm the validity of mixed emotions as a robust affective experience.
- A better understanding of how complex emotions are perceived and represented may help to explain and characterize emotion processing differences between typical and special populations (e.g. autism spectrum disorders).