Negatively correlated individual differences in audiovisual asynchrony

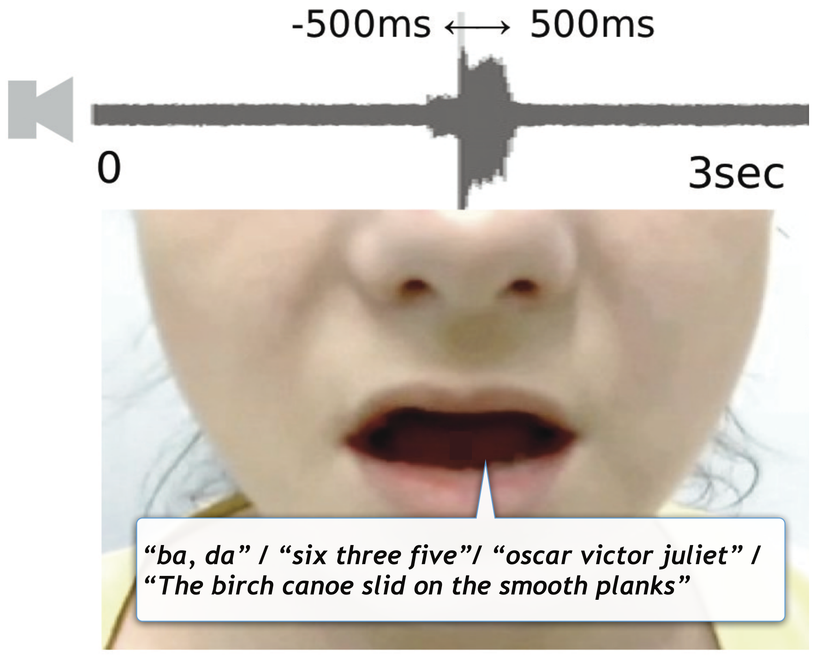
Elliot Freeman, Alberta Ipser
City, University of London, UK
Sussex University, UK

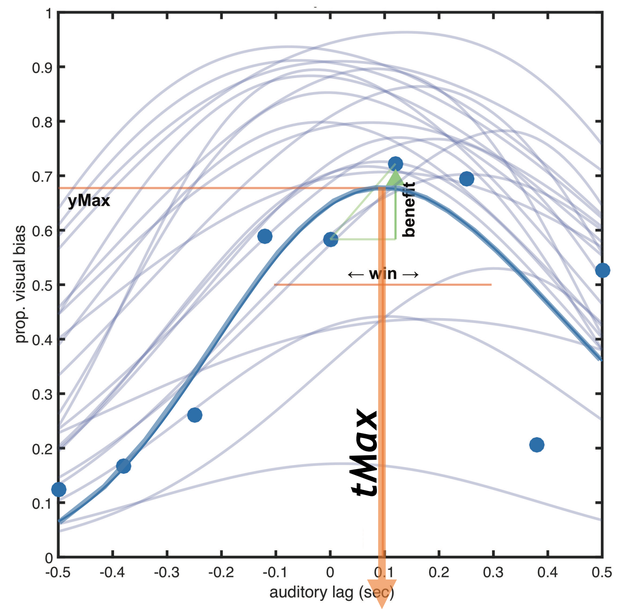
British Academy
Leverhulme

Background / Aims

- Sight and sound are out of synch
- Different measures of perceptual asynchrony correlate *negatively*
  - e.g. if vision subjectively leads audition in one individual, the same individual might show an opposite visual lag in other measures of audiovisual integration.
  - Freeman, Ipser et al, (2013) *Cortex* 49
- Previously observed using McGurk and Stream/Bounce illusions, versus Temporal Order Judgement, in dual task
- **Goals:** Generalise to different stimuli and tasks; constrain theory

Methods





Asynchronous lips + voice + background noise
- Identification or comprehension rating ➜
- Temporal order judgement (TOJ) ➜

Dual (concurrent) versus Single tasks

Dependent measures
tMax: Asynchrony for optimal
PSS: Point of subjective simultaneity

Results

Participants

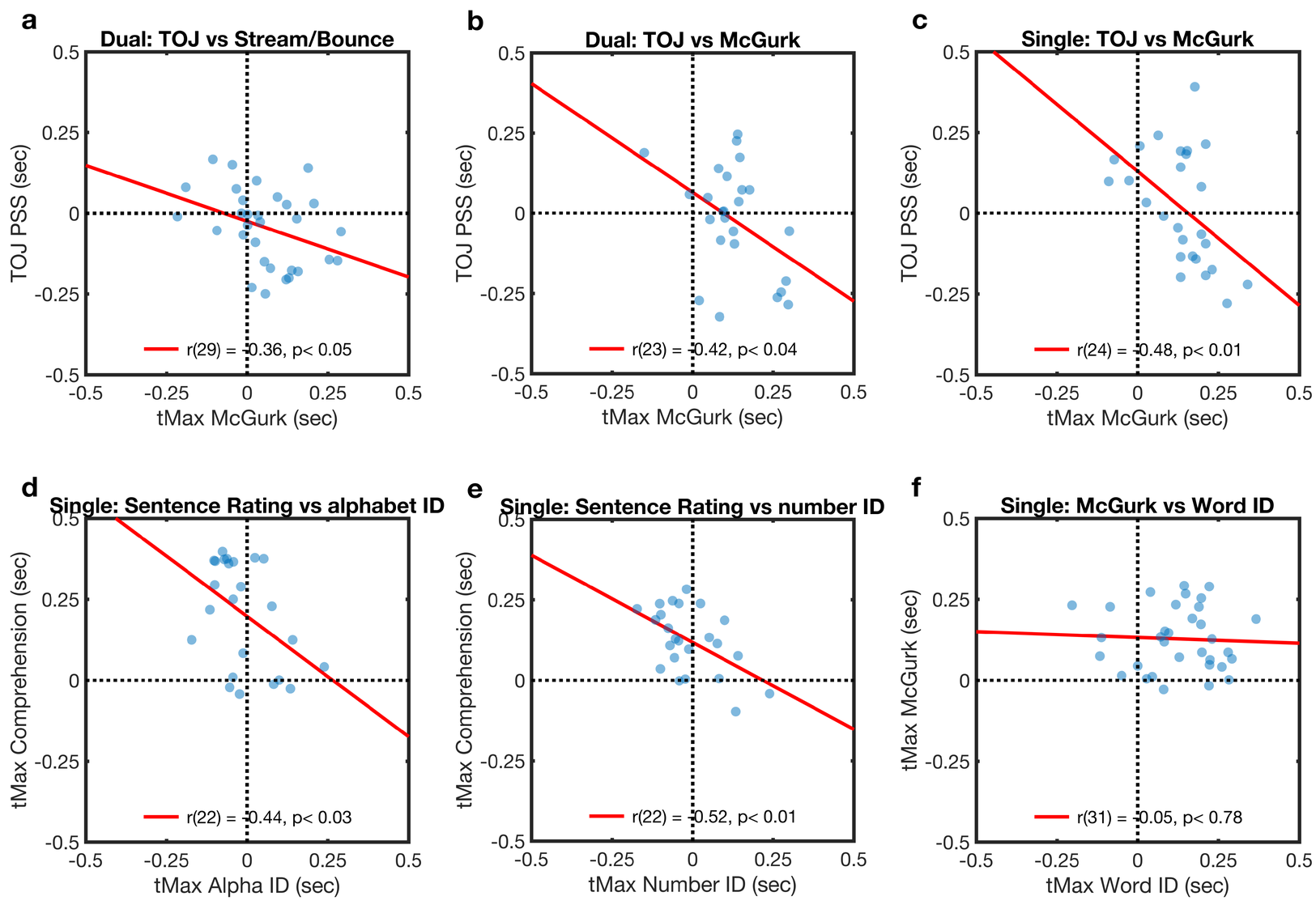
18-50, healthy with normal vision & hearing, native or fluent English; different groups tested in different tasks.

Significant negative correlations

a. Dual: TOJ vs Stream/Bounce
b. Dual: TOJ vs McGurk
c. Single: TOJ vs McGurk
d. Single: Sentence comprehension rating vs alphabet ID
e. Single: Sentence comprehension rating vs number ID

Not significant

f. Single: Word ID vs McGurk
  - Word vs syllable; congruent vs incongruent modalities



Implications

- -ve correlation: generalises across tasks and speech stimuli of varying complexity; also non-speech
- not an response bias dual task
- traits persist across testing sessions
- -ve correlation abolished only for word ID vs McGurk:
  - multiple vs single syllables?
- Supports Temporal Renormalisation

Temporal Renormalisation theory

- Different neural sub-networks for different tasks, e.g. McGurk vs TOJ
- Each sub-networks is subject to different audiovisual asynchronies
- Event timing in each sub-network is perceived *relative to* the distribution of asynchronies registered across the network.

New constraint

- To obtain -ve correlation, stimuli presented on different sessions should have *comparable temporal structure*. They may then recreate a similar distribution of event timings.