



## City Research Online

### City, University of London Institutional Repository

---

**Citation:** Freeman, E. D. & Ipser, A. (2017). Correlation of Individual Differences in Audiovisual Asynchrony Across Stimuli and Tasks: Constraints on Temporal Renormalisation Theory. *Perception*, 46(10), pp. 1205-1238. doi: 10.1177/0301006617710756

This is the accepted version of the paper.

This version of the publication may differ from the final published version.

---

**Permanent repository link:** <https://openaccess.city.ac.uk/id/eprint/18388/>

**Link to published version:** <https://doi.org/10.1177/0301006617710756>

**Copyright:** City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

**Reuse:** Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

---

---

---

City Research Online:

<http://openaccess.city.ac.uk/>

[publications@city.ac.uk](mailto:publications@city.ac.uk)

---

**Correlation of individual differences in audiovisual asynchrony across stimuli and tasks: constraints on Temporal Renormalisation theory.**  
**Elliot Freeman & Alberta Ipser**

Sight and sound are out of synch in different people by different amounts for different tasks. But surprisingly, different concurrent measures of perceptual asynchrony correlate negatively (Freeman, Ipser et al, 2013. *Cortex* 49, 2875–2887): thus if vision subjectively leads audition in one individual, the same individual might show a visual lag in other measures of audiovisual integration (e.g. McGurk illusion, Stream-Bounce illusion). We have explained this phenomenon with a tentative theory of Temporal Renormalisation: the neural timing within one neural sub-network (e.g. responsible for integrating audiovisual speech) is normalised relative to the neural timing of corresponding events across an ensemble of other semi-independent sub-networks (e.g. supporting subjective temporal order).

Here we explored the generality of the antagonistic timing phenomenon across different stimuli and task contexts. The negative correlation successfully replicated from dual-task to single-task contexts. Renormalisation thus persists across testing sessions, and does not depend on which tasks are concurrently performed. In contrast single-task measures of McGurk versus speech-in-noise word identification did not correlate, but these each involved different verbal stimuli.

This new constraint of stimulus-dependence suggests that renormalisation operates whenever individual sub-networks are each reacting to stimuli that have a similar temporal structure, even if they are probed by different tasks at different times. In such situations, the perceived timing of stimulus events evoked in each subnetwork may depend on their phase-lag relative to corresponding events resonating across the ensemble.