Correlation of individual differences in audiovisual asynchrony across stimuli and tasks: constraints on Temporal Renormalisation theory.
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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.