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The Impact of Synchrony Perception on Audiovisual Integration

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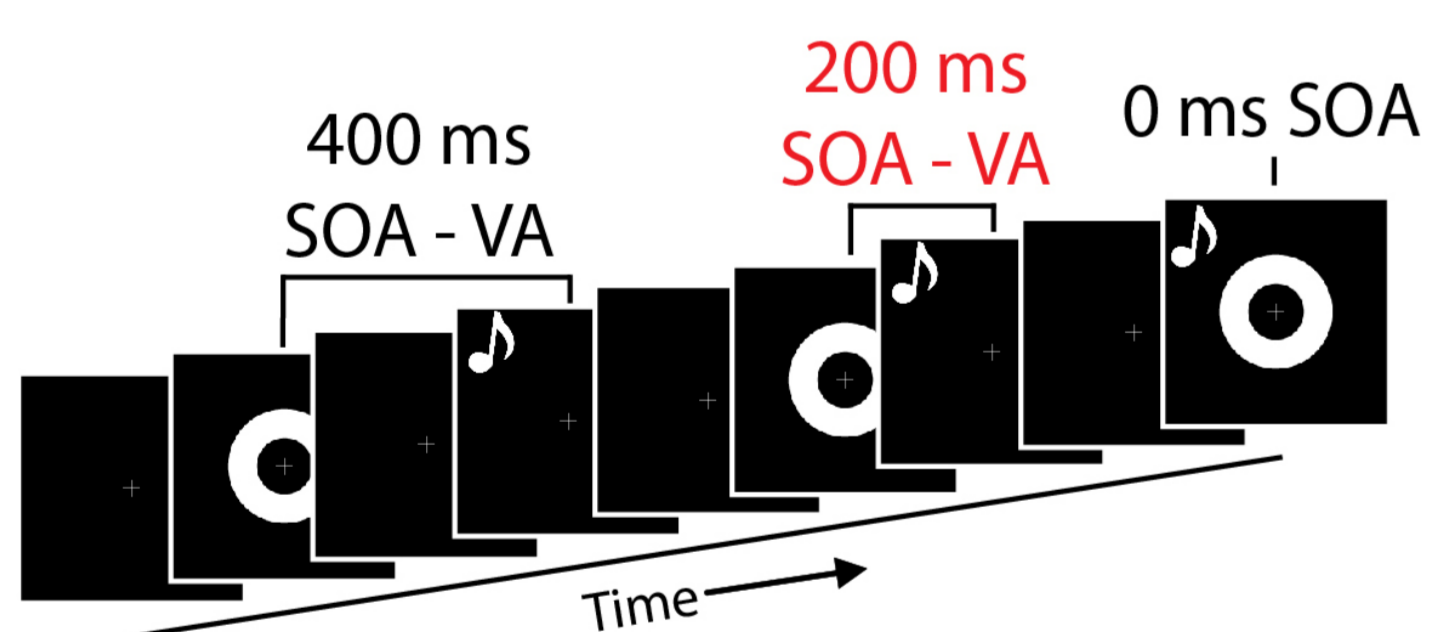
Background

- The binding of auditory and visual sensory inputs into a unified percept is known as multisensory integration.
- The relative timing of two sensory inputs strongly influences whether they will be integrated.
- Here, we will take advantage of the role of timing on multisensory integration to explore the neural underpinnings of the *perceptual* aspect of multisensory integration.

What are the auditory and visual mechanisms underlying the perceptual aspect of multisensory integration?

Methods

- Participants: 16 undergraduates
- Task: Simultaneity judgment task

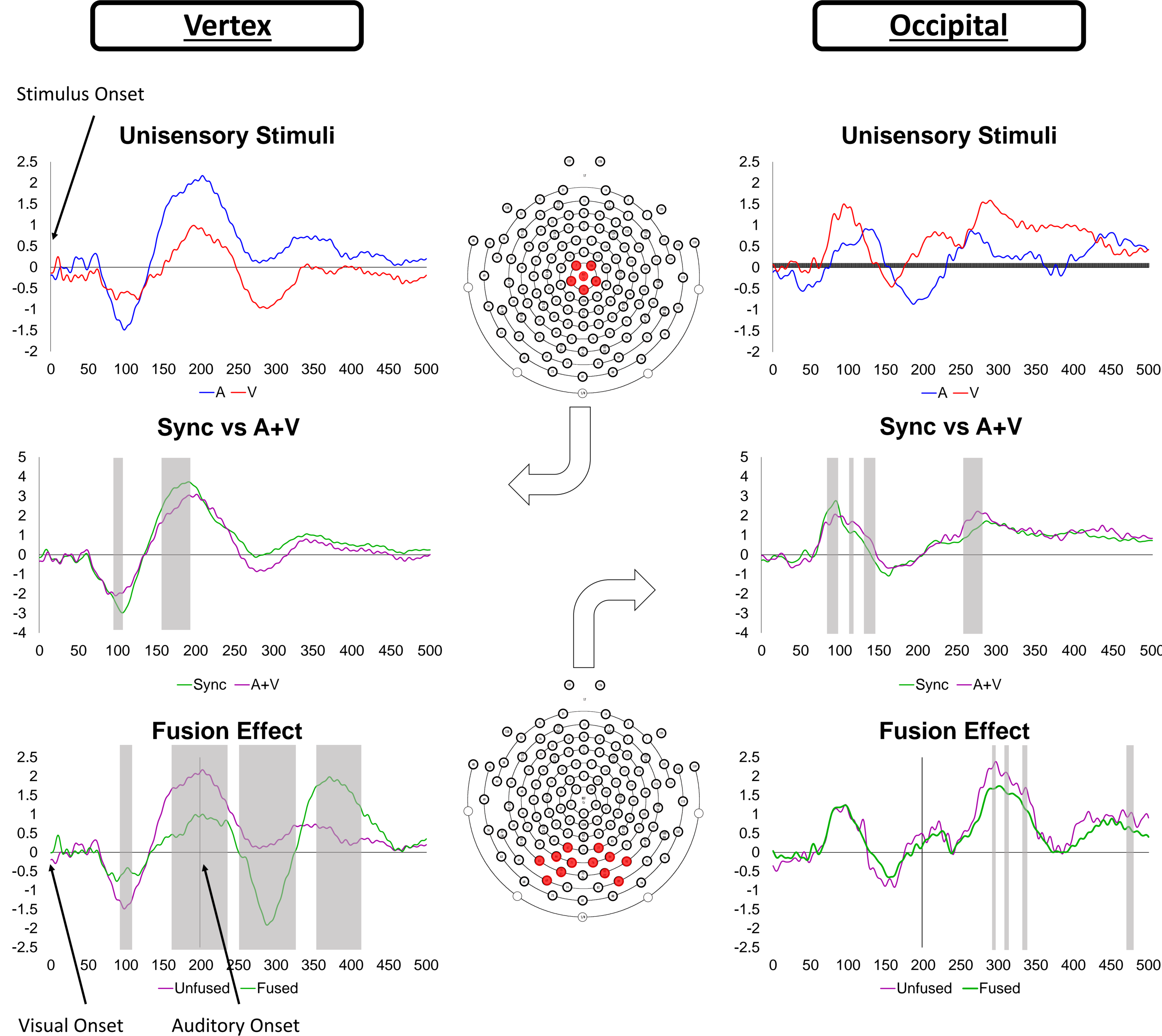


- Conditions: VOA, V200A, V400A, A, V
- 70 trials of each, 210 trials of V200A

Hypotheses

- VOA ERP's will show multisensory interactions relative to A+V within 200ms of stimulus onset.
- With V200A presentations, fused percepts will show interactions relative to unfused percepts within 200ms of auditory onset.

Results



Results

Vertex

- Multisensory interactions were observed around 100-110ms after AOV onset relative to A+V. In the V200A condition, interactions at these same time points following auditory onset were observed.

Occipital

- Multisensory interactions were observed between 90-150ms after AOV onset relative to A+V. In the V200A condition, interactions at these same time points following auditory onset were observed.

Results

- We observed multisensory interactions at time points commonly found in the literature, prior to 200ms following stimulus presentation.
- These were observed in canonical visual (occipital) and auditory (vertex) regions of the scalp.
- Nearly identical interactions were seen in the V200A condition between fused and unfused perceptions.

Multisensory interactions observed in ERPs are the result of *perceptual* binding

- Surprisingly, these results showed superadditive responses, as opposed to the more commonly found subadditive responses.

Discussion

- Our V200A manipulation allowed us to present identical stimuli and isolate changes in *perception*, and we observed similarly timed interactions following auditory onset, suggesting that these effects are driven specifically by perceptual differences.
- Interestingly, V200A waveforms prior to audio onset displayed significant differences relative to whether the upcoming auditory stimulus will be perceived as synchronous. Our next analysis will be to explore the possibility that this pre-auditory wave form can predict binding on a trial-by-trial basis.

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