# Multiple task set boundaries constrain the congruency sequence effect

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## INTRODUCTION

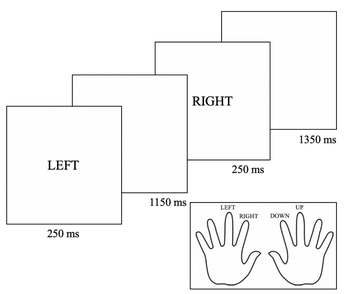
- Coping with distraction is critical in everyday life.
- One measure is the **congruency sequence effect (CSE)** in the prime-probe task: a smaller congruency effect after incongruent vs. congruent trials[1,2].
- Switching (vs. repeating) the shared sensory modality (i.e., visual vs. auditory) in which a prime and a probe appear in two consecutive trials reduces the CSE.[3]
- However, in the prime-probe task, participants employ a different S-R mapping for the prime (i.e., "do not respond") than for the probe (i.e., "respond").
- Q: Does switching modalities reduce the CSE even when subjects respond to both the prime and probe?

## HYPOTHESES

- **Sensory modality hypothesis** – Switching modalities reduces the CSE, because participants form modality-specific task sets.[3,7]
- **S-R mapping hypothesis** – Switching modalities does not reduce the CSE, because participants can employ the same response-based task set both within and across consecutive trials.[4,5]

## METHODS

**Prime-probe task**: Respond to the prime AND probe **(Exp. 1; N = 32)** or only to the probe **(Exp. 2; N = 32)**.



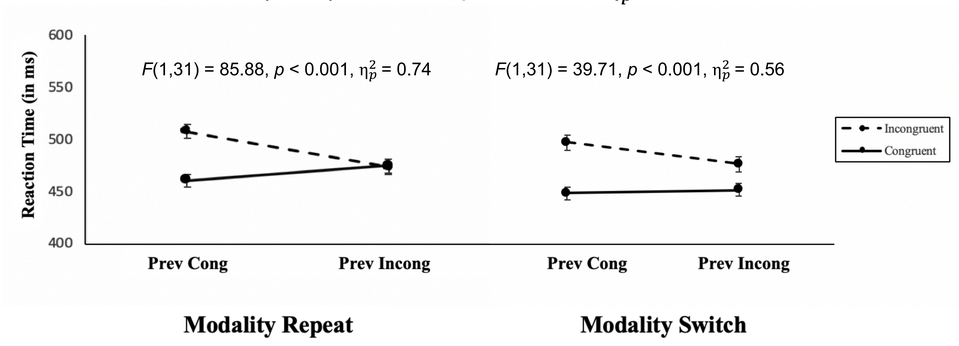

Experiments 1 & 2

## RESULTS

### Experiment 1

Switching modalities reduces the CSE

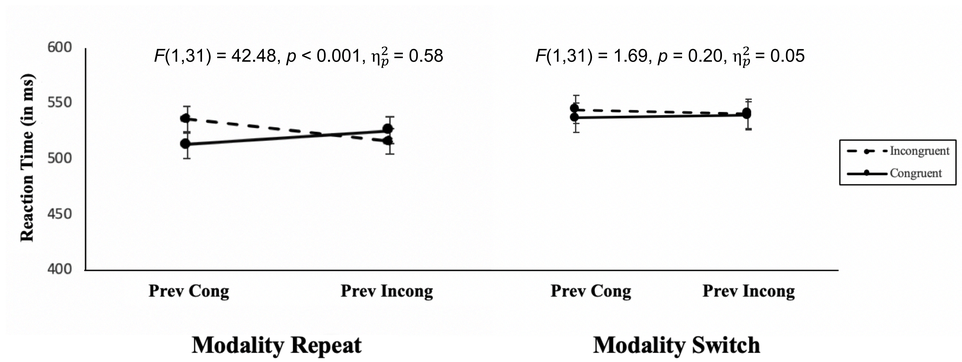
$F(1,31) = 20.58$, $p < 0.001$, $\eta_p^2 = 0.40$




### Experiment 2

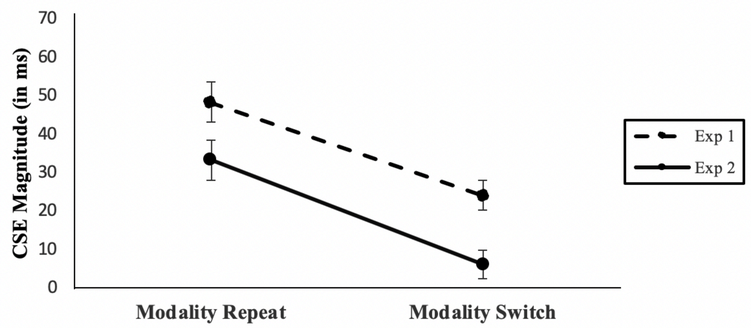
Switching modalities eliminates the CSE

$F(1,31) = 15.63$, $p < 0.001$, $\eta_p^2 = 0.34$




### Across-Experiment Analysis

Additive effects of sensory modality and S-R mapping




## CONCLUSIONS

- The results of Experiment 1 support the sensory modality hypothesis by showing that modality switching reduces the CSE even when participants use the same S-R mapping for the prime and probe.
- The results of Experiment 2 further reveal that the CSE is eliminated only when both the modality AND the S-R mapping change in consecutive trials.
- They also rule out the possibility that a long temporal interval between the prime and probe can account for our findings in Experiment 1.
- Finally, across-experiment analyses suggest that sensory modality and S-R mapping serve as independent task set boundaries for the CSE.

## FUTURE DIRECTIONS

- Does the modality boundary for the CSE partly reflect changes in spatial location between auditory stimuli in the headphones and visual stimuli on the screen?[8]
- Does response modality (vocal vs. manual) influence the magnitude of modality-specific CSEs?[6,7]

## REFERENCES

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