

# Isolating Interference and Facilitation Effects in the Flanker Task: A Mouse-Tracking Approach

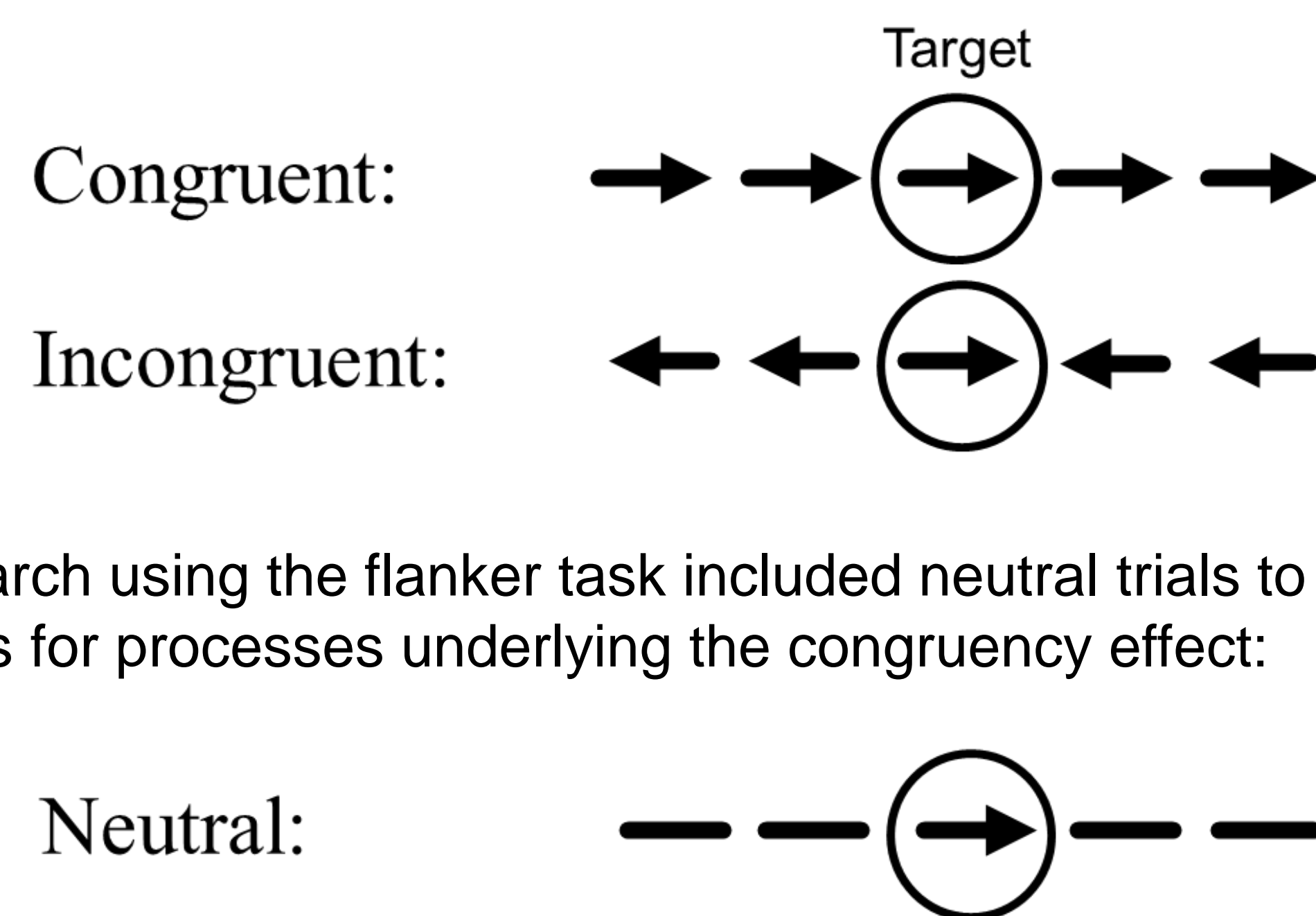


Kaleb T. Kinder, Aaron T. Buss, and A. Caglar Tas  
The University of Tennessee, Department of Psychology

## Background

**Selective attention** toward *task-relevant* information is influenced by the type of neighboring *task-irrelevant* information.

**Flanker Congruency Effect:** Performance is worse (e.g., slower RTs) when flankers share conflicting information with the target (incongruent) compared to consistent information (congruent)<sup>1</sup>.



Early research using the flanker task included neutral trials to test 3 hypotheses for processes underlying the congruency effect:

- Interference:** Conflicting information provided by incongruent flankers slows down target processing
- Facilitation:** Beneficial information provided by congruent flankers speeds up target processing.
- A combination of interference and facilitation.

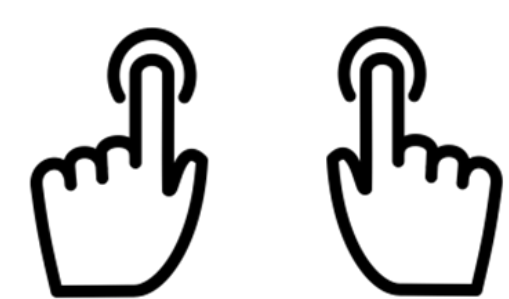
While previous research has provided reliable evidence to support interference<sup>1</sup>, evidence for facilitation has been mixed<sup>2,3</sup>.

## Research Question

**How robust are interference and facilitation in selective attention processing?**

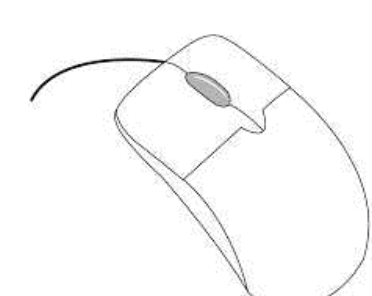
## Approach

Traditional approach: Examine **outcome-based measures** (e.g., RT, accuracy) to test for interference and facilitation.



Button-press designs

Mouse-tracking approach: Examine real-time **movement trajectories** (e.g., curvature) to test for interference and facilitation.

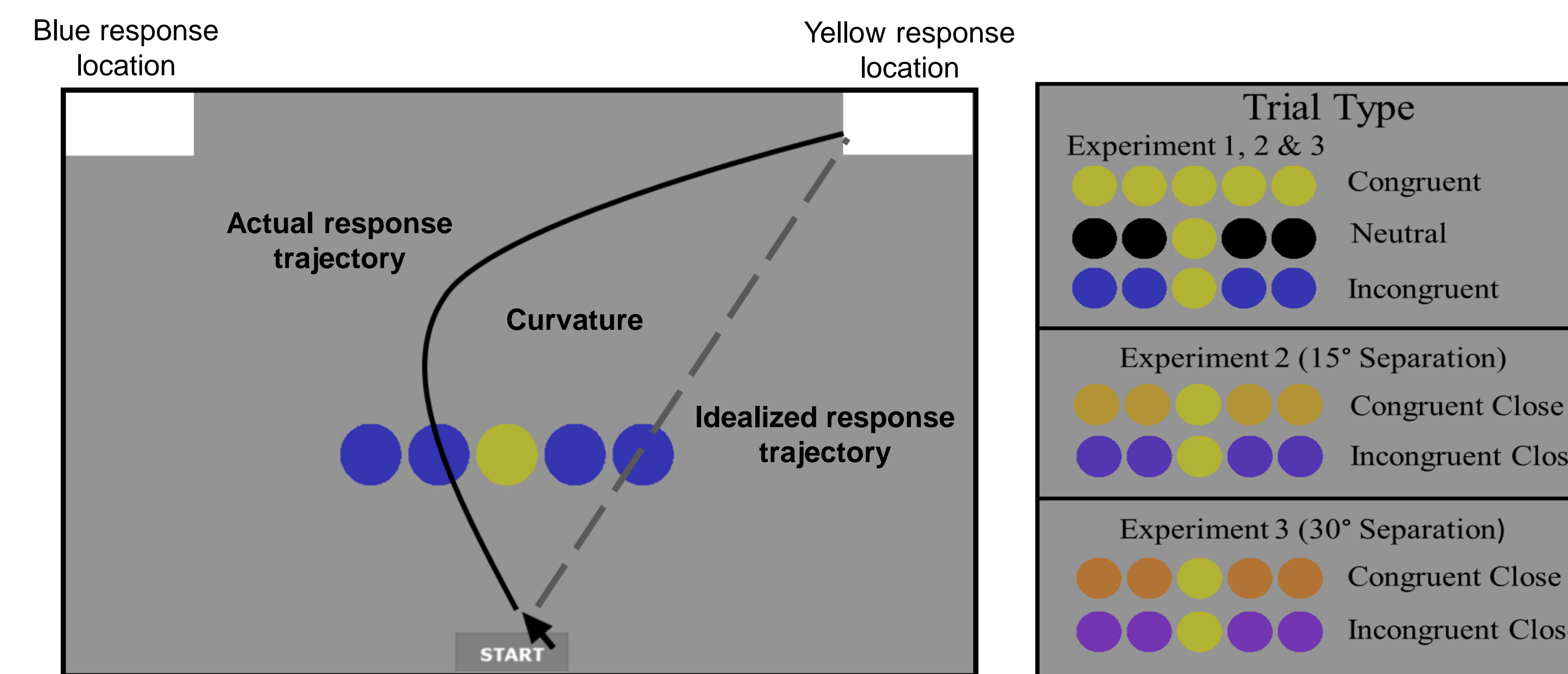


**Motivation:** Previous work from our lab suggests that detecting the facilitation effect may depend on differences between these methodologies<sup>4</sup>.

## Method

**Flanker Task:** Attend to the color of the central object and ignore the flankers.

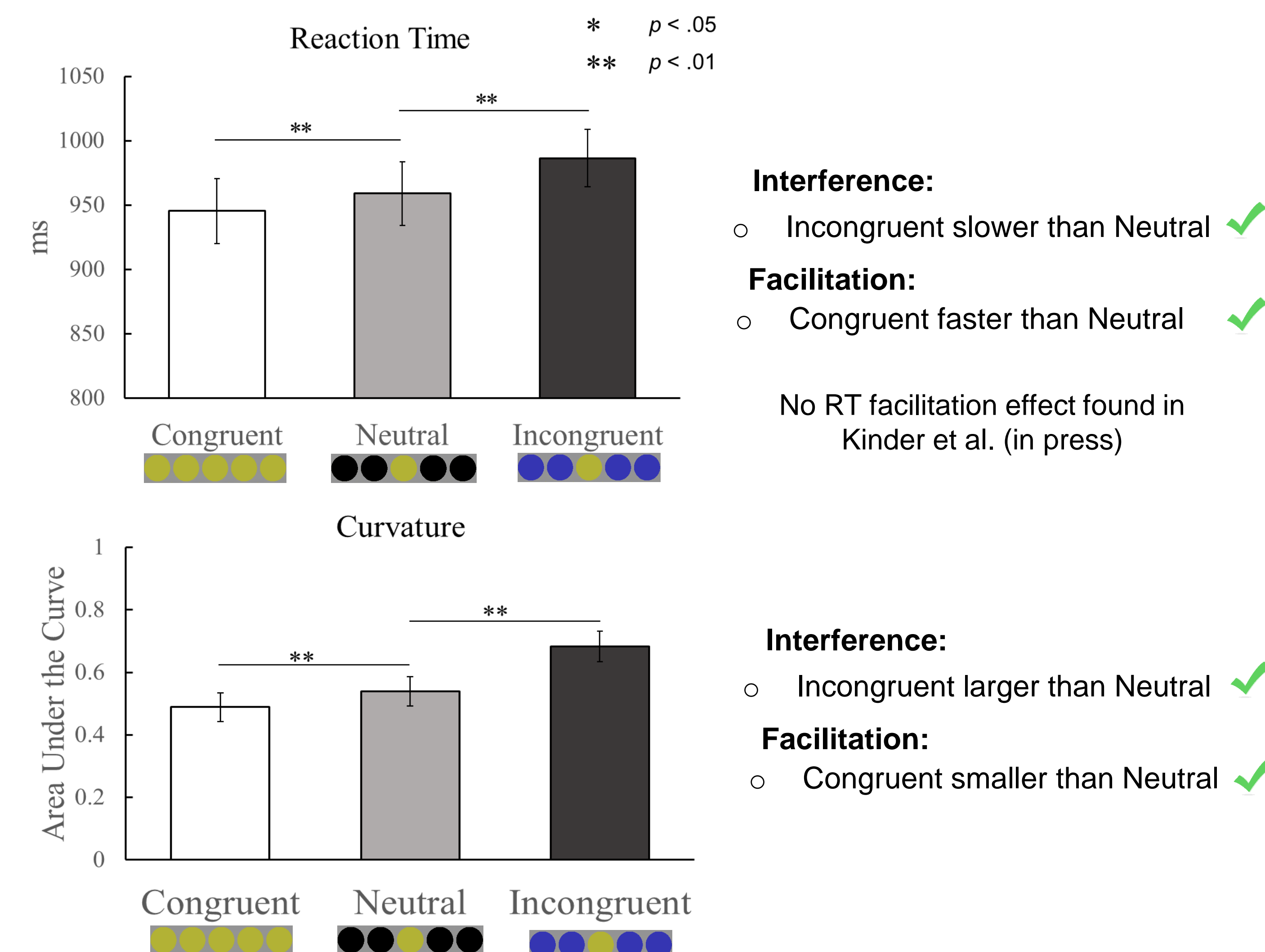
**Mouse-tracking:** We recorded response trajectories as participants moved from the start location to one of two response locations.



Exp. 1: 432 Trials, 3 trial types  
Exp. 2 & 3: 720 Trials, 5 trial types  
 $n = 24$  participants per experiment

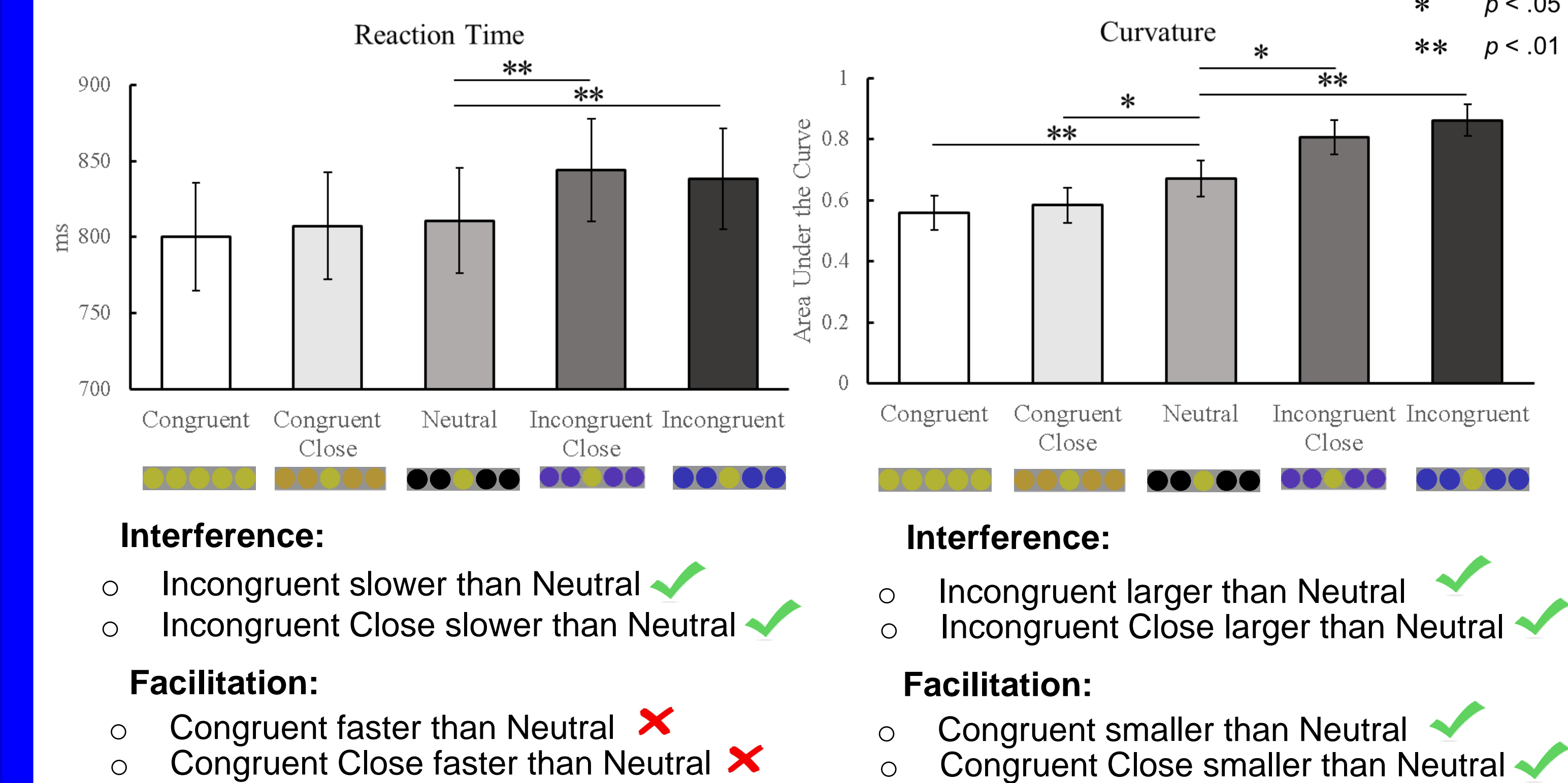
## Exp. 1 Results

Direct replication of Kinder et al. (in press)



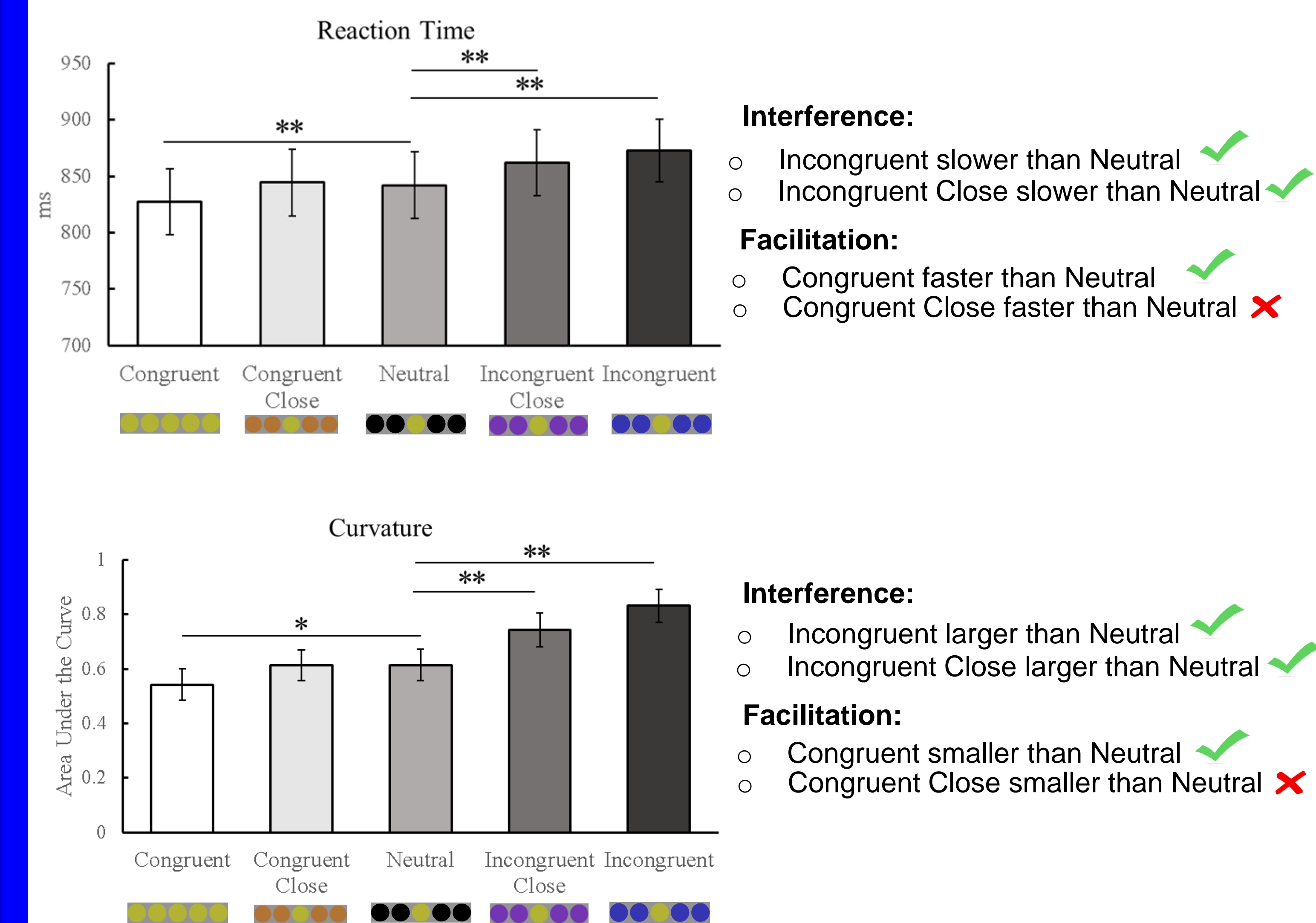
## Exp. 2 Results

Added Congruent Close and Incongruent Close trials (15° separation)



## Exp. 3 Results

Congruent Close and Incongruent Close trials modified to 30° separation



## Summary

- Across all Experiments, movement curvature measures provided reliable evidence for facilitation, whereas RT provided mixed results (also see Kinder et al., in press)
- Experiment 2 curvature results showed that facilitation and interference persisted at 15° separation.
- Experiment 3 showed that interference is more robust than facilitation.
  - Interference, but not facilitation, persisted even when the flankers were 30° different in color.

## References

- Eriksen, B. A., & Eriksen, C. W. (1974). Effects of noise letters upon the identification of a target letter in a nonsearch task. *Perception & psychophysics*, 16(1), 143-149.
- Sidarus, N., & Haggard, P. (2016). Difficult action decisions reduce the sense of agency: A study using the Eriksen flanker task. *Acta psychologica*, 166, 1-11.
- Flowers, J. H. (1990). Priming effects in perceptual classification. *Perception & Psychophysics*, 47(2), 135-148.
- Kinder, K.T., Buss, A.T., Tas, A.C. (in press). Tracking flanker task dynamics: Evidence for continuous attentional selectivity. *Journal of Experimental Psychology: Human Perception and Performance*.