

# The Role of Surface Feature and Spatiotemporal Continuity in Object-Based Inhibition of Return

\* THE UNIVERSITY OF IOWA

A. Caglar Tas\*, Michael D. Dodd\*\*, and Andrew Hollingworth\*

\*\* UNIVERSITY OF Nebraska Lincoln

## Introduction

**Object Correspondence:** Maintaining stable representations of objects across changes (e.g., motion) and disruptions (e.g., occlusion) in visual input.

Two alternatives: Spatiotemporal Continuity (Kahneman et al., 1992; Mitroff & Alvarez, 2007)

Surface feature Continuity (Hollingworth & Franconeri, 2009; Moore et al., 2008)

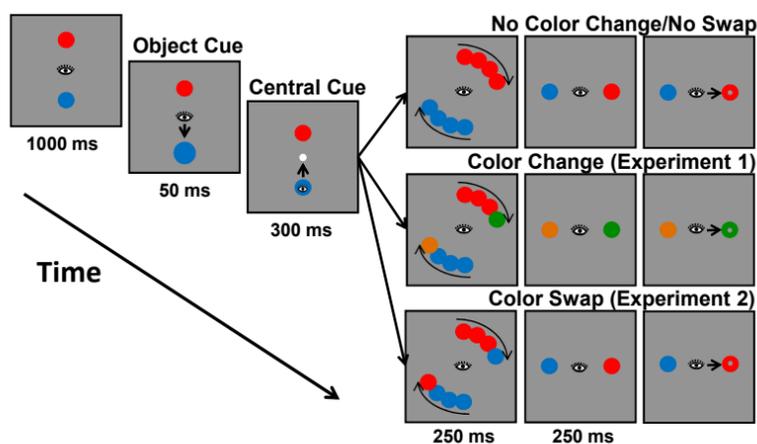
**Object-based Inhibition of Return (IOR):** Delayed target detection within a previously attended object (Tipper et al., 1994)

**Present Study:** Investigated the relative contributions of spatiotemporal and surface feature properties to defining the objects of object-based IOR.

Advantages of object-based IOR as a means to study object correspondence:

- Inhibition is associated directly with the object itself.
- Task does not depend on participants' conscious recollection/report of objects and their features.

## Experiment 1 and 2 Method

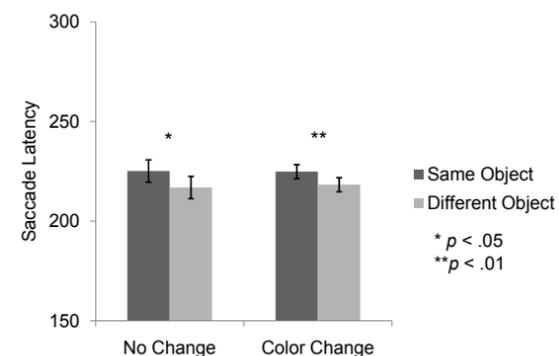


Participants instructed to fixate the cued object, central cue, and then the target dot as quickly as possible. Dependent measure: saccade latency to the target dot.

Spatiotemporal information always consistent (i.e., smooth motion to new locations). Color consistency manipulated to probe role of surface feature correspondence in object-based IOR.

## Experiment 1

In the Color Change condition, objects changed to *new* colors during motion.

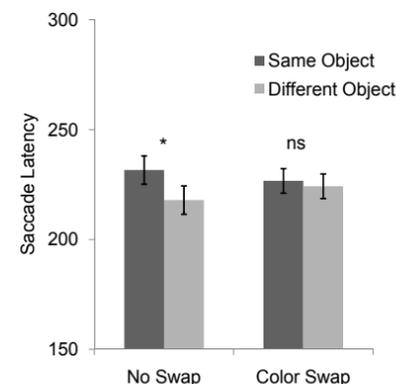


Significant object-based IOR effect for both No Change (8.3 ms) and Color Change (6.5 ms) conditions.

A salient change in surface features was not sufficient to eliminate object-based IOR (established on the basis of spatiotemporal history)

## Experiment 2

Object colors *swapped* during motion, ensuring that the color of the test object was associated with either the originally cued or uncued object.



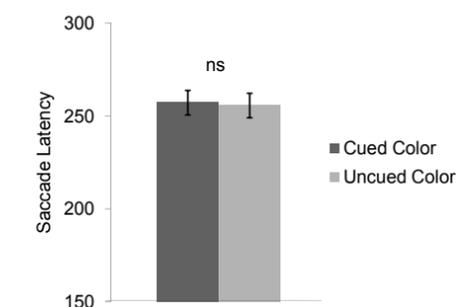
Significant object-based IOR effect for No Color Change condition (11.8 ms), but this effect was eliminated for Color Swap condition (3.8 ms).

Both spatiotemporal and surface feature (i.e., color) information was used to establish correspondence.

## Experiment 3

Can surface feature properties establish correspondence despite spatiotemporal *discontinuity*?

Instead of moving smoothly to the new locations, the disks jumped to their new locations. Therefore, inhibition is measured as the difference between saccade latency to the cued and uncued color.



No significant IOR effect for cued color (1.5 ms).

Color information is not sufficient to overcome spatiotemporal discontinuity.

## Conclusions

Both surface feature and spatiotemporal information can be used for object correspondence when both are informative (Experiment 2).

Spatiotemporal continuity is sufficient to establish correspondence in the presence of a salient surface feature discontinuity (Experiment 1).

Color alone is not sufficient to establish correspondence in the presence of a salient spatiotemporal discontinuity (Experiment 3).

## References

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