Object-based Attention Selection of non-uniform Objects with Changing Surfaces

Introduction
- Egly et al. (1994) showed an object benefit effect (OBE) for targets in a cued rectangle
- No OBE found for objects with non-uniform surface:
  1. Judgment task (Kramer & Watson, 1999)
  2. Egly et al. object task (Hecht & Vecera, 2007)
- OBE elicited for objects with surface changes at part boundaries (Hecht & Vecera, 2007)
- Will objects with non-uniform surfaces that change over time elicit an OBE?

General Methods
- 2 (Presentation Type) x 3 (Cue Validity) within subject design
- 6 blocks x 80 trials
- 60% valid trials, 20% invalid same-object trials, 20% invalid different-object trials
- Rectangles aligned either horizontally or vertically
- Target: Larger stimulus (square or circle)
- Counterbalanced over cue location, target type and object alignment

Experiments
- Experiments 1-3: Static versus Dynamic Trials
  - Experiment 1: Dynamic uniform to non-uniform; Static Uniform
  - Experiment 2: Dynamic non-uniform to uniform; Static Uniform
  - Experiment 3: Dynamic non-uniform to non-uniform; Static non-uniform
- Experiment 4: Mixed Static Trials
  - Static uniform; Static non-uniform

Results
Mean Accuracy
- High accuracy (>90%), no speed-accuracy tradeoff

Reaction Time
- Similar RT patterns obtained for median RT in all experiments (RT for incorrect responses, < 150 ms and > 2000 ms not analyzed)
- Experiment 1: OBE in dynamic and static conditions
- Experiment 2: OBE in dynamic and static conditions
- Experiment 3: No OBE in dynamic and static conditions
- Experiment 4: OBE in static uniform condition but not static non-uniform condition

Conclusions
- Objects with dynamically changing surface elicit an OBE as long as a uniform surface is presented at either the beginning or the end of the change
- To determine if a set of visual structures constitutes an ‘attentional object’, one also needs to consider their temporal characteristics

References