

## ABSTRACT:

### "Spatial, Featural and Temporal Cues that Capture your Attention"

It is well known that visual attention can be involuntarily directed toward things and places that may be behaviorally relevant to the observer. For example, a localized, flashed stimulus automatically attracts spatial attention. We have recently been investigating what other properties of 'exogenous' cues are most effective for attracting visual attention.

In the first study we show that a looming stimulus can attract spatial attention when it is on a collision course with the observer's head. This in itself is not surprising, what is remarkable is the precision of this mechanism: a looming stimulus that just misses the observer is ineffective in capturing attention, despite being consciously perceptually indistinguishable from the collision stimulus.

In our second study we show that when a transient cue attracts attention, the effects of attention also involuntarily spread to targets sharing the same color as the cue. This feature-based influence on exogenous attention is effective even when the colored target is in a different spatial location from the exogenous cue. In fact, spatial and featural cueing effects appear to operate independently.

Our third study shows that attentional cues operate not only across spatial location and stimulus features, but also over particular moments in time. Subjects performed an RSVP task at fixation while a sequence of natural scenes was placed in the background. In a subsequent memory task, only the scene presented coincidentally with the target in the RSVP task was recalled above chance, as though the entire visual scene was 'attentionally captured' at the moment of target detection. Surprisingly, subjects were unaware of this enhanced performance and felt that they were guessing.

Together, these studies show exogenous attention is not a simple mechanism directing attention across space, but depends strongly on both the featural and temporal properties of cued targets in a sophisticated way that can be dissociated from conscious awareness. Exogenous cue do not merely direct attention to behaviorally important objects, also to the spatial, temporal and featural information that may be important to the observer.