New Objects and New Motion

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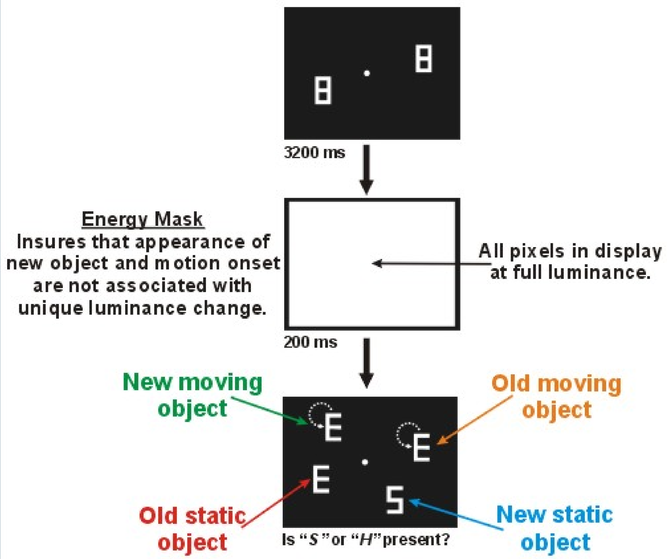
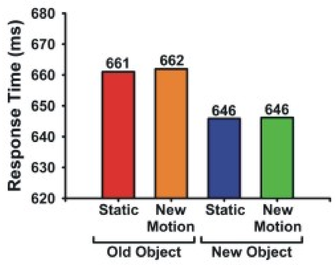
EXPERIMENT 1

Past studies have identified a handful of stimulus events that appear to capture attention in a stimulus-driven, bottom-up fashion. Two such events are the appearance of a new object and occurrence of new motion in a scene (motion onset). To date, previous research has focused on these events in isolation. In the present study, however, we utilized a visual search paradigm to study the attentional influence of new objects and new motion under conditions in which each stimulus event occurred in isolation (e.g., a pre-existing object began moving, or a new static object appeared) as compared to when the events co-occurred (e.g., a new moving object appeared).



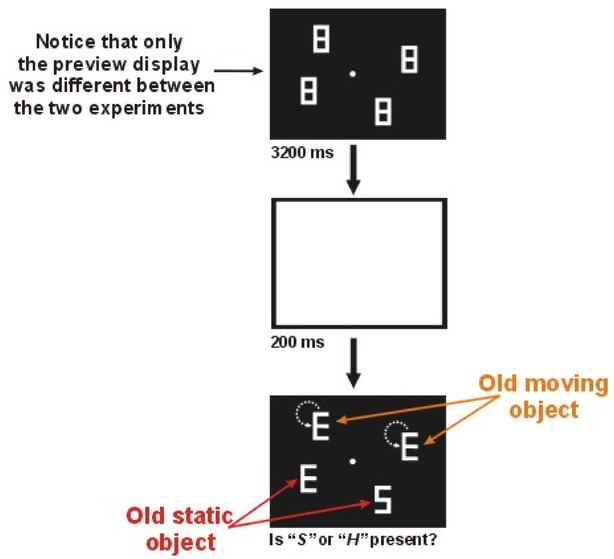


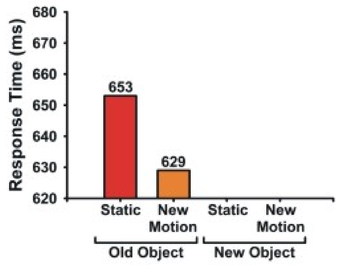
RESULTS

Overall, participants were faster to respond when the target appeared in a new object as compared to when it appeared in a pre-existing object, $F(1,14) = 6.09$, $p < .05$. However, participants were equally fast to respond regardless of whether the item had recently begun moving or not, $F(1,14) < 1$. Also there was no evidence of an interaction between object age and motion status, $F(1,14) < 1$.

EXPERIMENT 2

In past studies demonstrating attentional capture by new motion, the new motion was coupled with a unique luminance transient. As such, failure to find an attentional effect for new motion in Experiment 1 may have been related to the absence of a unique luminance transient rather than the co-occurrence of new objects. To test this possibility, we conducted a 2nd experiment in which we evaluated the influence of new motion on attention in isolation, without a unique luminance transient or co-occurrence of new objects.





RESULTS

Participants were faster to respond when the target appeared in a newly moving item as compared to when it appeared in a static item, $t(11) = 2.31$, $p < .05$. This suggests that the results of Experiment 1 were related to the co-occurrence of new objects and not to the absence of a unique luminance transient.

SUMMARY & CONCLUSIONS

In the present study, when new objects and new motion were presented simultaneously, new objects were given attentional priority whereas the influence of new motion on attention was eliminated (Exp 1). Of note, when new motion was studied in isolation, however, it was effective at capturing attention (Exp 2).

Our findings provide empirical support for the notion that the inability of earlier studies (e.g., Hillstrom & Yantis, 1994; Yantis & Egeth, 1999) to find attentional capture by new motion may be attributable to the coincident presentation of the visual display (comprising several new objects) and the motion in those studies. In the present experiments, new motion captured attention but only when it occurred in isolation during a period of relative "temporal calmness" (von Mühlenen et al., 2005). The present results also replicate and extend recent work by Davoli, Suszko, and Abrams (in press) by demonstrating that new objects can capture attention in the absence of unique luminance transients *and* despite the presence of another attention-grabbing event.

METHODOLOGICAL DETAILS

Participants. Fifteen and twelve college-aged students served as participants in Experiments 1 and 2, respectively. All were naïve, and none served in both experiments.

Apparatus, *Procedure*, & *Design*. The sequences of events for each experiment are shown in the figures to the left. The placeholders were 2° high and 1° wide and were positioned pseudo-randomly on the display. Motion of an item (when applicable) occurred along a tight circular path (2° diameter). Target presentation was balanced such that the target was equally likely to appear in each of the different types of items, the target letter was equally likely to be "S" or "H," and the distracter letters were equally likely to be "E" or "U." The target-to-response key mapping (i.e., "z" or "/" key) was counterbalanced across subjects. Trial types were randomly mixed.

For each experiment, participants completed 24 practice trials followed by 288 experimental trials. If a participant responded incorrectly, responded less than 300 ms after target onset, or failed to respond within 3000 ms, a tone and relevant message (i.e., "Wrong Response," "Too Early," or "Too Slow," respectively) was presented.

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