

Is it better to burn out or fade away? The effect of sudden offsets on target recovery.

PROBLEM

Do sudden changes in visual information, i.e. transients, affect memory for object position during attentive tracking?

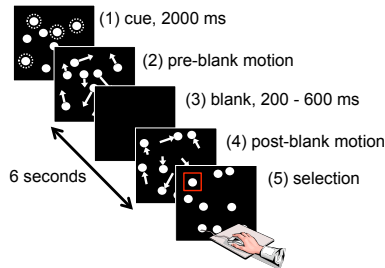
INTRODUCTION

In the target recovery (TR) task, participants track several moving objects and must find them again after a blank. The objects might **pause** or **move** during the blank. Performance is higher when they pause (Keane & Pylyshyn, 2006). Why does this occur? This effect may be related to the visual transient that occurs with the objects' offset before the blank (Aks, et al., VSS 2009; Haladjian et al., VSS 2009). Transients, like sudden onsets and offsets, capture attention (Theeuwes, 1991). This may affect how target position is memorized for target recovery.

HYPOTHESIS

The visual transient related to the objects' sudden offset could trigger or facilitate the encoding of position into memory.

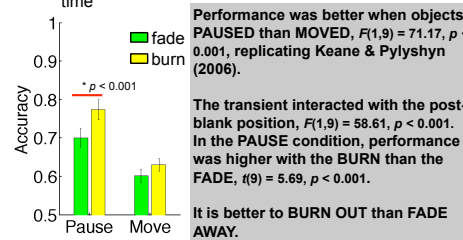
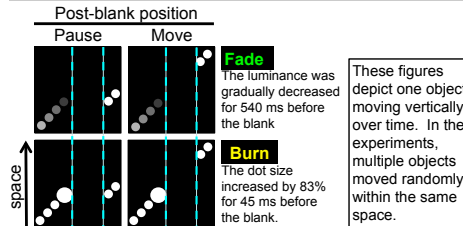
Target Recovery Task



- (1) Rings cued 4 out of 8 dots as tracking targets.
- (2) The dots moved in a random walk.
- (3) Blank began 1, 2, 3, 4, or 5 seconds after the motion started.
- (4) The dots **paused** or **moved** during the blank, so they reappeared in the same or different locations post-blank.
- (5) Participants selected dots with the mouse. Accuracy = # targets selected / # targets.

Experiment 1: Is it better to burn out or fade away?

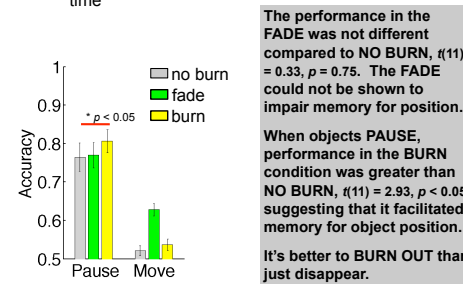
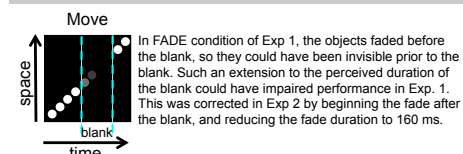
HYPOTHESIS: If transients facilitate memory for object position, then target recovery should be facilitated when the transient related to objects' offset is increased rather than decreased.



Experiment 2: Is it better to burn out or just disappear?

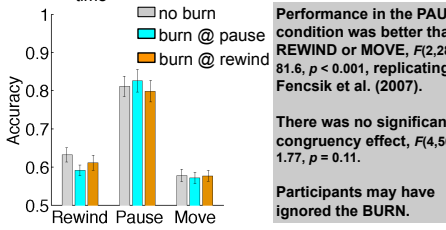
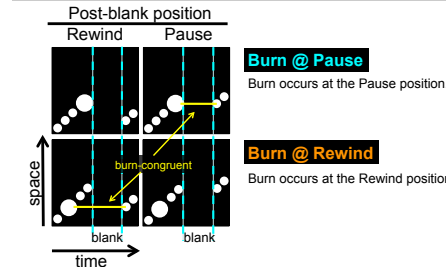
HYPOTHESIS 1: If transients facilitate memory for object position, performance should be higher when objects **BURN** out compared to when there is **NO BURN** at offset.

HYPOTHESIS 2: If the **FADE** impairs memory for position, performance should be lower compared to the **NO BURN**, even if the blank is shorter than those conditions.



Experiment 3: Does the burn trigger memory for position?

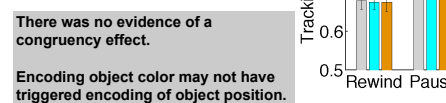
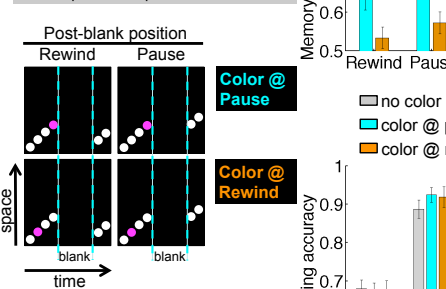
HYPOTHESIS: If the **BURN** triggers memory for object position, performance should be affected by the spatial congruency of the burn onset and the post-blank position.



Experiment 4: What if people memorize the transient?

MEMORY TASK: Colors appeared on all dots for 160 ms. Participants memorized the colors of the targets. After selecting dots in the TR task, participants reported whether or not a centrally presented dot appeared in a target color.

HYPOTHESIS: If explicit memory for a transient event affects memory for object position, performance should be affected by the spatial congruency of the event and the post-blank position.



SUMMARY

We examined whether visual transients could affect memory for object position in target recovery.

Some evidence showed that increasing object size just prior to offset, which increased the transient, facilitated target recovery when objects paused during the blank (Exp 1 and 2).

Burns before disappearance did not affect performance (Exp 3), perhaps because memory for object position may be related to the most recent transient event.

Explicit memory for object color was not shown to affect memory for object position (Exp 4).

CONCLUSION

These results provide some evidence that increasing the transient related to objects' offset in TR facilitates memory for object position.

It's better to **BURN OUT!**

REFERENCES

- Aks DJ, Haladjian HH, Pylyshyn ZW, Hakkinen AS. (2009) Multiple object tracking with blink-contingent scene changes. Poster presented at Vision Sciences Society Annual Meeting, Naples FL.
- Haladjian HH, Pylyshyn ZW, Kugel A. (2009) Multiple object tracking through temporal gaps created by the fading of objects. Poster presented at Vision Sciences Society Annual Meeting, Naples FL.
- Fencsik DE, Klieger SB, Horowitz TS. (2007) The role of location and motion in the tracking and recovery of moving objects. *Perception and Psychophysics*, 69(4), 567 – 577.
- Keane BP, Pylyshyn ZW (2006) Is motion extrapolation employed in multiple object tracking? Tracking as a low-level non-predictive function. *Cognitive Psychology*, 52(4), 346 – 368.
- Theeuwes J. (1991) Exogenous and endogenous control of attention: the effect of visual onsets and offsets. *Perception and Psychophysics*, 49(1), 83 – 90.