



# The temporal dynamics of target and distractor occurrence in the global effect of saccades.

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## INTRODUCTION – THE GLOBAL EFFECT:

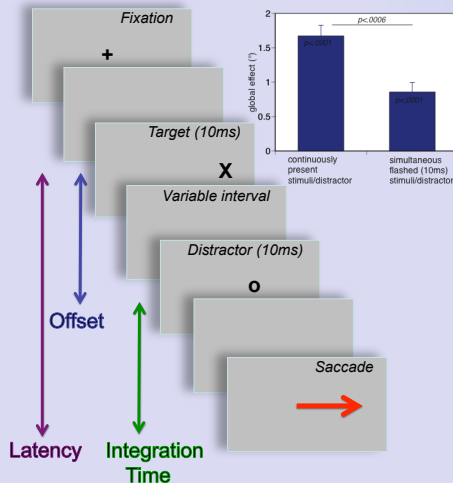
- A distractor close to a target will cause saccades to deviate to a point between the two.
- It is modeled as spatial averaging of neural activity generated by targets and distractors in the colliculus.

## QUESTIONS ABOUT ITS TEMPORAL DYNAMICS:

- Do the target and distractor have to overlap in time to produce a global effect?
- What is the shortest latency saccade at which global effects start to appear?
- What is the latest the distractor can appear before the saccade to be integrated into a global effect?

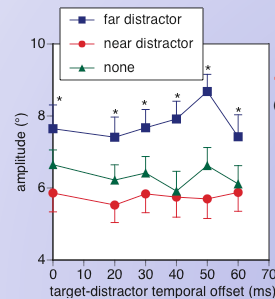
## STRATEGY:

- Flashed 10ms target and 10ms distractor, with variable interval between them.



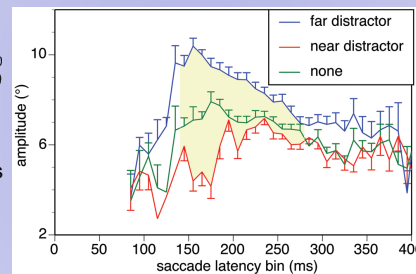
## EXPERIMENT 1:

- 13 subjects, 360 trials
- Near, far and no distractor conditions
- 0, 20, 30, 40, 50 and 60 ms target-distractor offsets



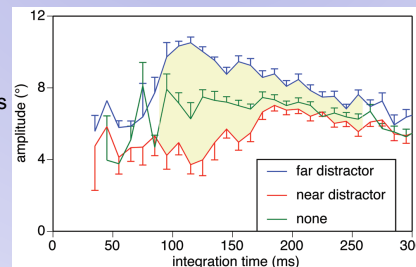
### 1. Offset effect

Global effect remains significant up to 60ms offset (interval of 50ms)



### 2. Saccade latency

Global effect first reaches significance at 140ms latency



### 3. Integration time

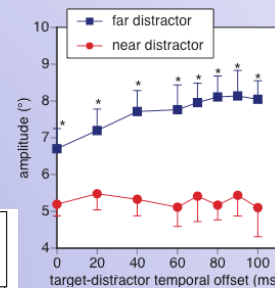
Global effect first reaches significance at 90ms integration time

## CONCLUSIONS:

- Global effects from spatial averaging are still robust even when stimulus and distractor are separated in time by up to 90ms, and show no evidence of declining.
- Global effect is more apparent in short latency saccades, with latencies between 140ms and about 280ms.
- Global effect can occur with as little as 90ms between the distractor onset and initiation of the saccade (integration time), about 40ms shorter than the estimate for second-target effects in double-step saccades.

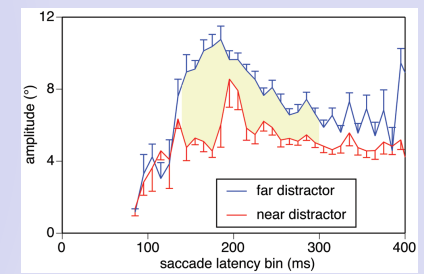
## EXPERIMENT 2:

- 12 subjects, 320 trials
- Near and far distractor conditions
- 0, 20, 40, 60, 70, 80, 90 and 100 ms target-distractor offsets



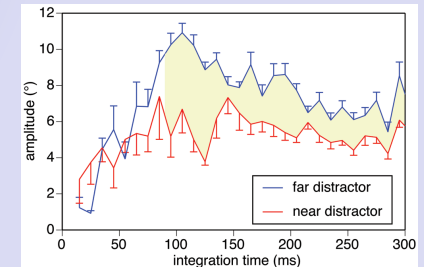
### 1. Offset effect

Global effect remains significant up to 100ms offset with no evidence of decline – appears to be increasing instead



### 2. Saccade latency

Global effect first reaches significance at 140ms latency



### 3. Integration time

Global effect first reaches significance at 90ms integration time