

Stimulus contrast and the remote distractor effect: differential effects for foveal and peripheral distractors



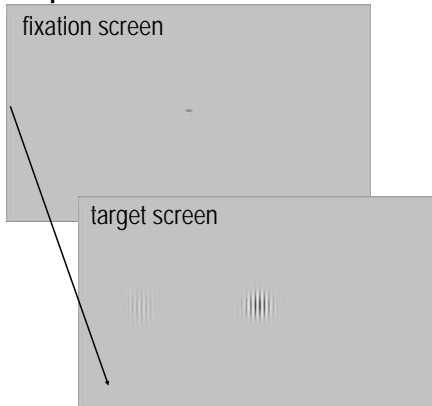
Introduction

Distractors presented at the same time as the saccade target prolong saccadic latency (remote distractor effect, RDE; e.g. [1]). In the absence of distractors, saccadic latencies decrease with increasing target contrast [e.g. 2]. Assuming a saccade map account of the RDE in which target- and distractor-related activity compete, we examined how target and distractor contrast influence the magnitude of the RDE.

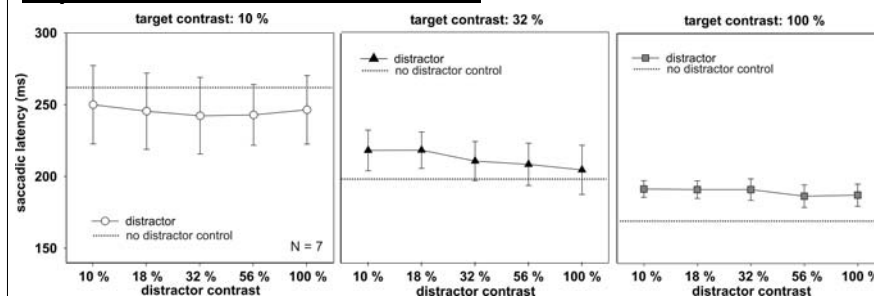
Methods

Subjects fixated a central fixation stimulus. After a random delay the saccade target was presented on the left or right. Distractors appeared in 3/4 of the trials simultaneously with the target. Target direction was blocked in Exp. 2.

Exp. 1: foveal distractors



Experiment 1: Foveal distractors

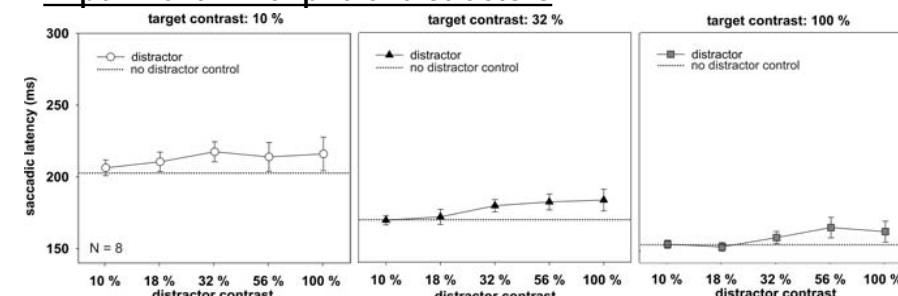


Error bars: 95 % confidence interval of the RDE (difference: distractor condition - control)
 ⇨ RDE unaffected by distractor contrast (slight decrease in the 32 % target contrast condition)
 ⇨ RDE depended on target contrast: the higher the target contrast the stronger the RDE

Assumptions

- target- and distractor-related activity inhibit each other in a common saccade map (e.g. [3])
- distractor-related activity and the corresponding inhibition of target-related activity is only transient (e.g. [4])
- the distractor can only perturb saccades if distractor-related activity coincides with target-related activity
- response onset latency (ROL) of activity in the saccade map depends on stimulus contrast and stimulus eccentricity:
 - the higher the contrast, the shorter the ROL [5]
 - the closer to the fovea, the shorter the ROL [?]

Experiment 2: Peripheral distractors

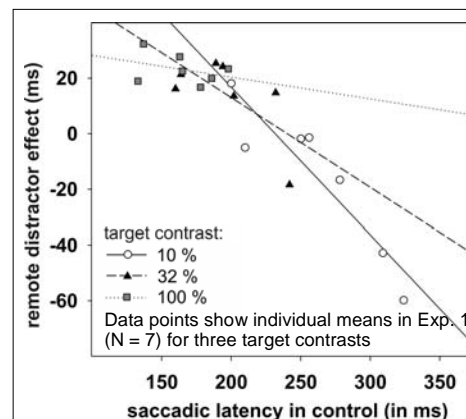
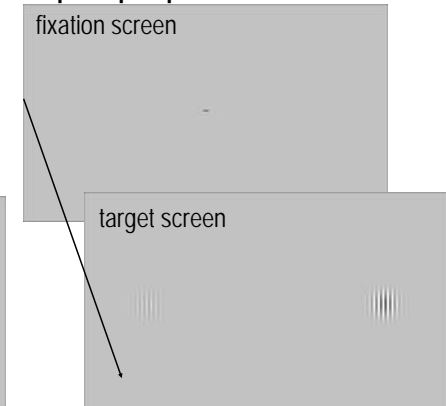


Error bars: 95 % confidence interval of the RDE (difference: distractor condition - control)
 ⇨ RDE depended on distractor contrast: the higher the distractor contrast the stronger the RDE
 ⇨ RDE unaffected by target contrast

Foveal distractors have shorter ROLs than peripheral targets. Therefore, distractor-related activity might already be about to subside when target-related activity reaches the saccade map. Reducing ROLs of the distractor (high distractor contrast) or delaying ROLs of the target (low target contrast) accentuates the difference and reduces the RDE.

Peripheral distractors have longer ROLs than peripheral targets: Because target direction was blocked, the saccadic response could be prepared which may shorten ROLs for target-related activity. Thus, only high-contrast distractors with short ROLs might reach the saccade map in time to have a perturbing influence (i.e. to show a RDE).

Exp. 2: peripheral distractors



Why might the RDE even reverse for some conditions in Exp. 1?

Distractors might not only serve as perturbing stimuli but also as warning signals for target appearance. As this effect builds up slowly, it is only observed for targets yielding long latencies (cf. left) or when the distractor is presented well before the target [1].

References

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Acknowledgements & Contact

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