

# Influence of distractor size and contrast on the remote distractor effect

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## Introduction

It is well known that a distractor stimulus presented at the same time as the saccade target prolongs saccadic latency (remote distractor effect, RDE; e.g. [1]). In the absence of distractors, saccadic latencies are influenced by target characteristics such as contrast [e.g. 2]. We wondered whether the same characteristics, when varied in a distractor, produced similar effects on the RDE. For instance, saccades are faster to high-contrast targets. Consequently, would the RDE also be stronger for high-contrast distractors?

## Methods

### Determining contrast thresholds (Exp. 1 and 2):

One staircase (2-up 1-down = 71% correct threshold) per target/distractor size with fixed step sizes and a 2-AFC procedure was run. S's indicated in which of two time intervals a peripheral (Exp. 1) or central (Exp. 2) Gabor patch appeared.

### General procedure and stimuli:

Ss fixated a central fixation stimulus. After a random delay, the target Gabor was presented on the left or right. Central distractors appeared in 2/3 (Exp. 2) and 3/4 (Exp. 3) of the trials.

#### Equipment:

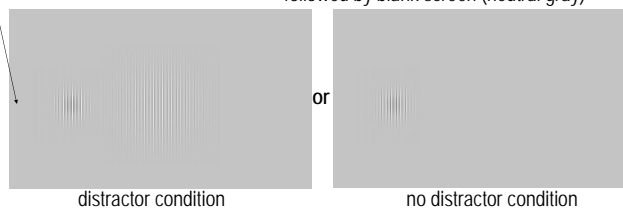
- Cambridge Research Systems (CRS): Visage
- CRS High Speed Video Eyetracker

#### Fixation screen (left):

- small line element: 0.10 deg x 0.03 deg
- presentation time: 500 - 1200 ms

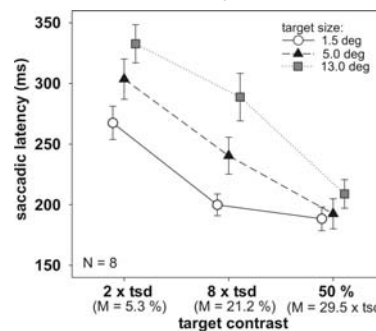
#### Target screen (below): presented for 800 ms

- targets: Gabors of 4 c/deg spatial frequency
- target eccentricity: 10 deg
- distractors: likewise Gabors of 4 c/deg
- followed by blank screen (neutral gray)



## Experiment 1: target size and contrast

To vary Gabor size and contrast independently, the SD of the Gaussian envelope was adjusted according to [3], formula 3. Reported sizes reflect perceived Gabor diameter. **No distractors** were presented in this experiment.



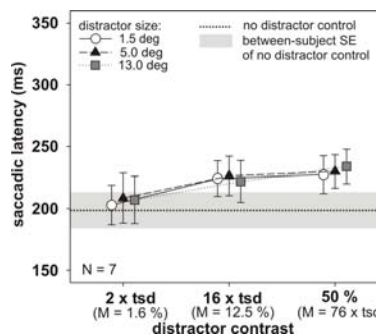
Saccadic latencies decreased with increasing target contrast and with decreasing target size. Also, the influence of target size on saccadic latency declined in the highest contrast condition.

- error bars = between-subject standard error.

- tsd = threshold.

## Experiment 2: distractor size and contrast

Target size and contrast were fixed at 5 deg perceived diameter and 80 % contrast.



RDE did not vary with distractor size. Although it increased with distractor contrast, this was due to the fact that no significant RDE was found in the 2 x tsd condition, whereas the 16 x tsd and 50% condition produced a significant RDE of approx. equal size (25-30 ms).

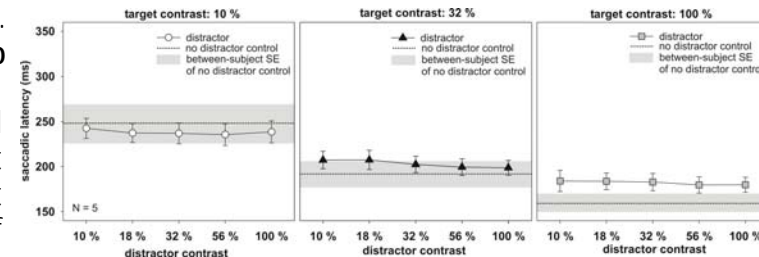
That is, the RDE was unaffected by distractor contrast once distractor contrast was high enough to produce a sign. RDE.

## Conclusion:

**A variable (i.e., size or contrast) that influences saccadic latency when varied in a target does not influence the RDE in the same way when varied in a distractor: as long as the distractor is clearly visible, no differences in RDE occur.**

## Experiment 3: target & distractor contrast

Targets and distractors were fixed at 1.5 deg perceived diameter



The RDE did not vary with **distractor** contrast, except for the 32% target (slight decrease). In contrast, the RDE increased with increasing **target** contrast

(though only the 100% target produced a significant RDE of approx. 22 ms). Further, the influence of **target** contrast on saccadic latency was attenuated in the presence of a distractor (cf. left: slope less steep for distractor condition).

## Conclusions:

- Distractor characteristics do not influence the RDE substantially.
- Further, the influence of target characteristics on saccadic latency is attenuated with a distractor.
- The RDE is stronger for targets that produce shorter latencies.

## References

- [1] Walker, R., Deubel, H., Schneider, X. S. & Findlay, J. M. (1997). Effect of Remote Distractors on Saccade Programming: Evidence for an Extended Fixation Zone. *Journal of Neurophysiology*, 78(2), 1108-1119.
- [2] White, B. J., Kerzel, D. & Gegenfurtner, K. R. (2006). The spatio-temporal tuning of the mechanisms in the control of saccadic eye movements. *Vision Research*, 46, 3886-3897.
- [3] Fredericksen, R. E., Bex, P. J. & Verstraten, F. A. (1997). How big is a Gabor patch, and why should we care? *Journal of the Optical Society of America*, 14(1), 1-12.

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