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Congruency of gaze capturing events modulates the attended field of view

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PURPOSE -

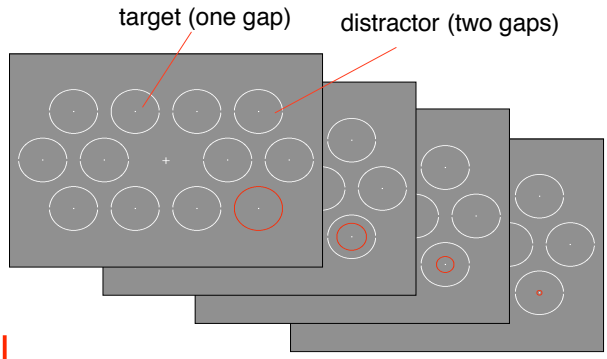
Determine to what extent one's attended field of view is set by the expected relevancy of environmental signals.

INTRODUCTION -

Inefficient (serial) search has generally been found to require a narrow attentional focus [1], whereas efficient (parallel) search allows for a much wider attended field of view. Nevertheless, during inefficient search participants' attentional focus can be wide when they simultaneously have to detect a singleton appearing in their peripheral view [2].

We hypothesized that one's attentional field of view is set not by the type of task *per se*, but primarily by the expected relevancy of signals in peripheral view.

METHODS -



Participants (n=14) searched for a target or freely viewed the scene.
A gaze capturing event (GCE, a red imploding circle, duration 100 ms) appeared randomly during each trial.

The GCE either pointed to the target (congruent) or a distractor (incongruent) at different percentages per block (40 trials/block)

Congruency was reported to participants before each block presentation.

ANALYSIS -

Eye movements after GCE onset were classified as captures (1, to GCE) or no captures (0, elsewhere), We considered the proportion of captures (capture effectiveness) as a function of the retinal angle of GCE onset (eccentricity).
We fitted a sigmoid (i.e. logistic regression) to the data:

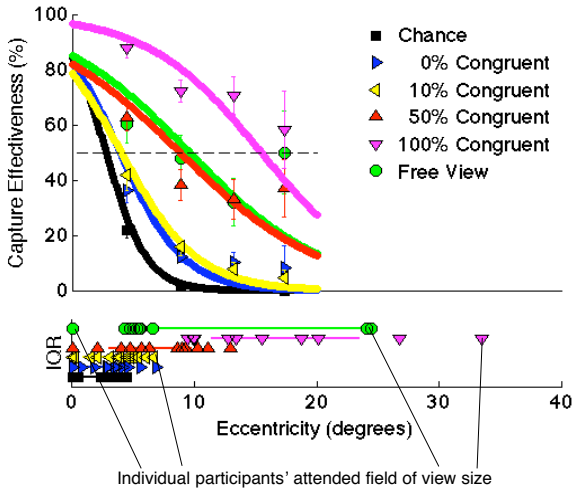
$$capture\ effectiveness = \frac{e^{\beta_0+\beta_1\cdot eccentricity}}{1+e^{\beta_0+\beta_1\cdot eccentricity}}$$

We chose the eccentricity at 50% effectiveness to be a measure of the size of the attended field of view:

$$eccentricity_{50\%} = -\frac{\beta_0}{\beta_1}$$

RESULTS -

Attended field of view size increases with GCE congruency.



Errors (vertical) show standard error of the mean.
Errors (horizontal) show interquartile ranges (IQR)

CONCLUSION -

We conclude that the width of the attended field of view is modulated by the expected relevancy of environmental events

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REFERENCES

[1] Theeuwes, J., & Burger, R. (1998). Attentional control during visual search: the effect of irrelevant singletons. *J Exp Psychol Hum Percept Perform, 24*(5), 1342-1353.
[2] Braun, J., & Sagi, D. (1990). Vision outside the focus of attention. *Percept Psychophys, 48*(1), 45-58