

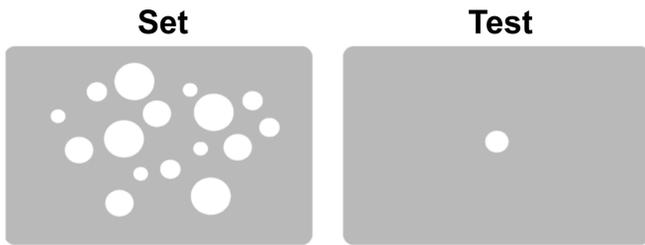
# Statistical stability facilitates visual search.

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## Does the statistical stability of background context modulate visual search?

### Background:

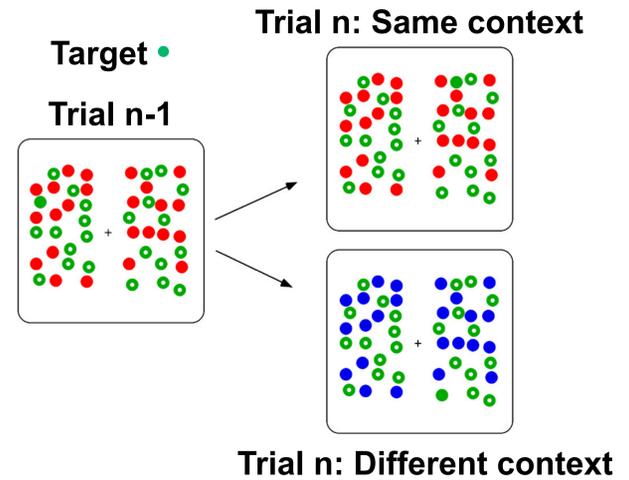
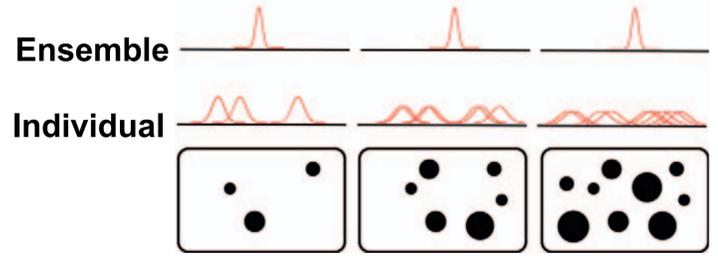
- The visual system represents overall statistical properties of ensembles along single dimensions (Ariey, 2001).



Mean judgment is more precise than Member ID

- In addition to anchoring perception to salient targets across saccades (e.g., Irwin, 1992; Melcher & Colby, 2008), the visual system can capitalize on statistical regularities to create and maintain perceptual stability.
- Targets in learned spatial contexts are detected faster (Chun & Jiang, 1998).
- Contextual cueing is even observed in patients' neglected hemifield (Saevarsson, et al., 2007).

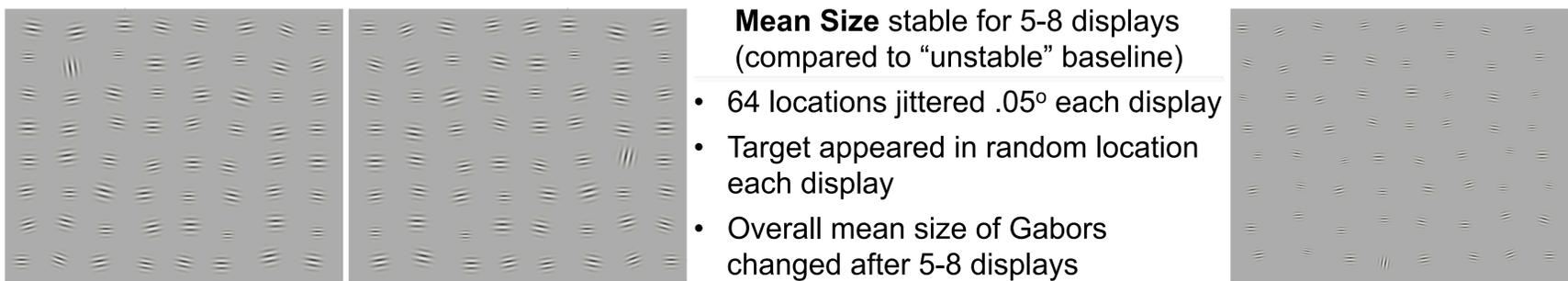
- Ensemble representations may act as a complementary strategy to limited capacity focused attention (Alvarez, 2010).



## Does statistical stability of the background context modulate the efficiency of visual search?

### Methods:

"Is the target (orientation singleton) tilted left or right?"



Mean Size stable for 5-8 displays (compared to "unstable" baseline)

- 64 locations jittered .05° each display
- Target appeared in random location each display
- Overall mean size of Gabors changed after 5-8 displays

Display 1/Mean size 1

Display 2/Mean size 1

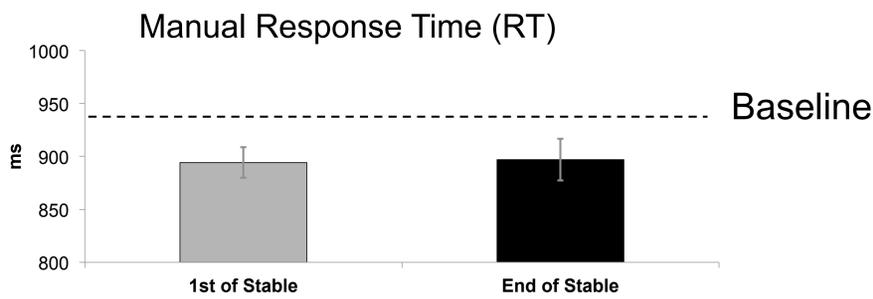
Displays 3 to 4-7/Mean size 1

Display 1/Mean size 2

Time ... Stability builds ... Stability breaks

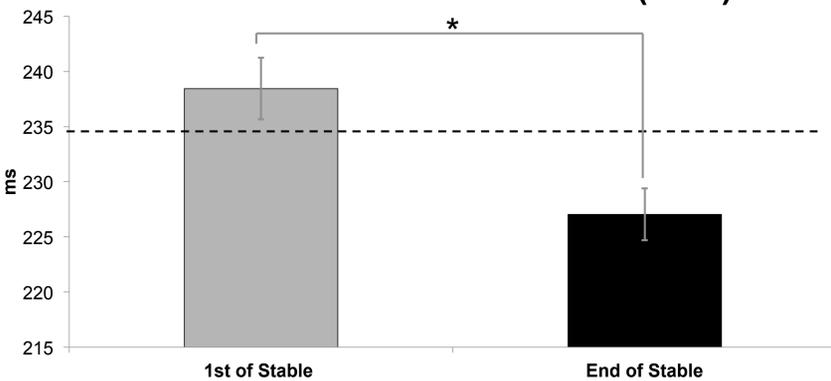
### Results:

n=11  
(Correct trials only)  
(Accuracy in all Ss & conditions > 94%)

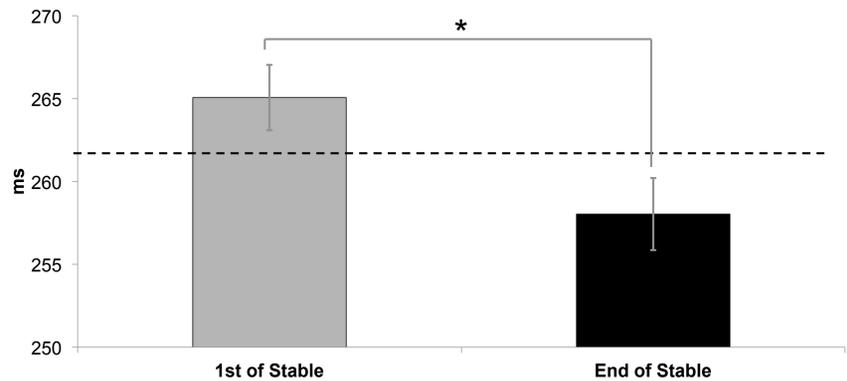


No differences in correct RTs

#### Saccadic Reaction Time (SRT)



#### Duration of Fixations



Shorter SRTs when background statistics are stable

Shorter fixations when background statistics are stable

### Conclusions:

- Establishing statistical stability of the background context facilitates visual search in terms of faster saccadic reaction times and shorter fixation durations.
- Our perception of visual stability across saccades may depend on statistical properties, and not just matching objects...

Statistical stability increases the efficiency of visual search.