Averaging of Crowd Attention

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Gaze perception

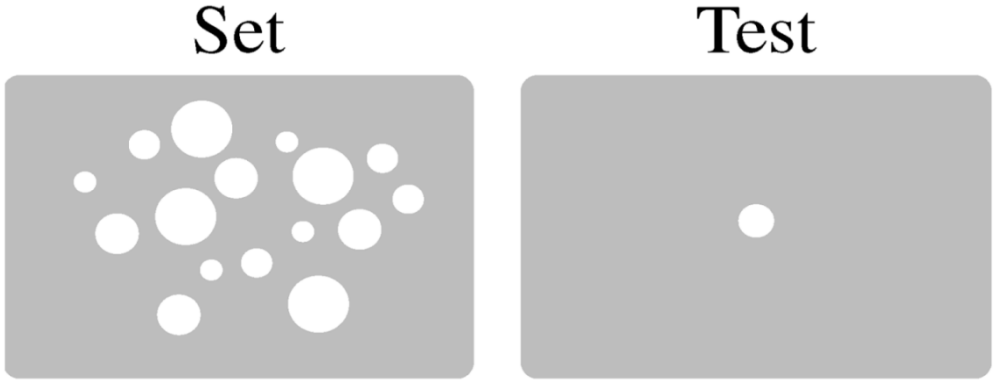
Another person's gaze is an important social cue

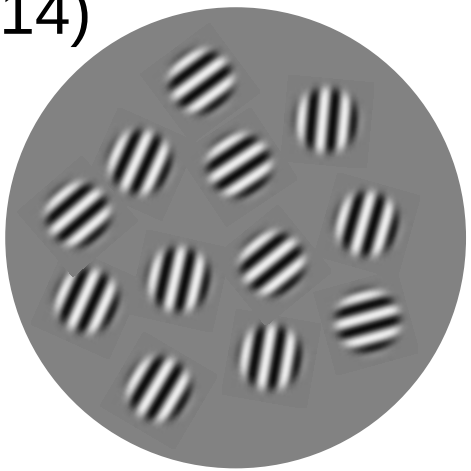
What about the attention of a crowd?

Greater influence on attention than an individual face (Gallup 2012 & Milgram 1969)

Background

- We are sensitive to the average of visual properties of objects
- Size (Ariely 2001)
- Orientation (Dakin 1997)
- People typically *subsample* → use √N of N elements
- Some evidence that facial features can be averaged: Emotion & Identity (Whitney et al 2013/2014)



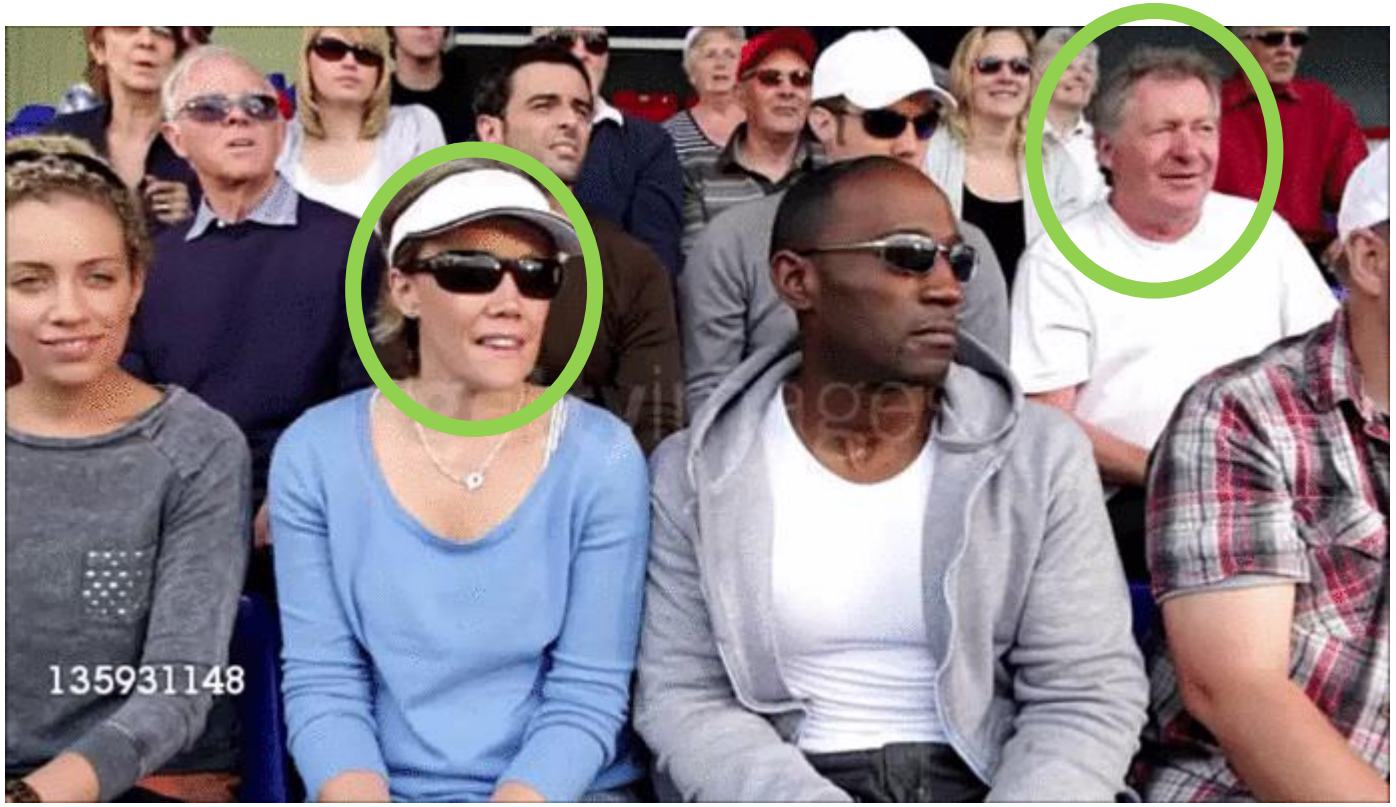


Aims

- To see what limits averaging group attention using **equivalent noise analysis**
- Are there differences between head rotation and gaze deviation?
- Do people sample equally across an array or are they biased by certain elements?

Internal noise

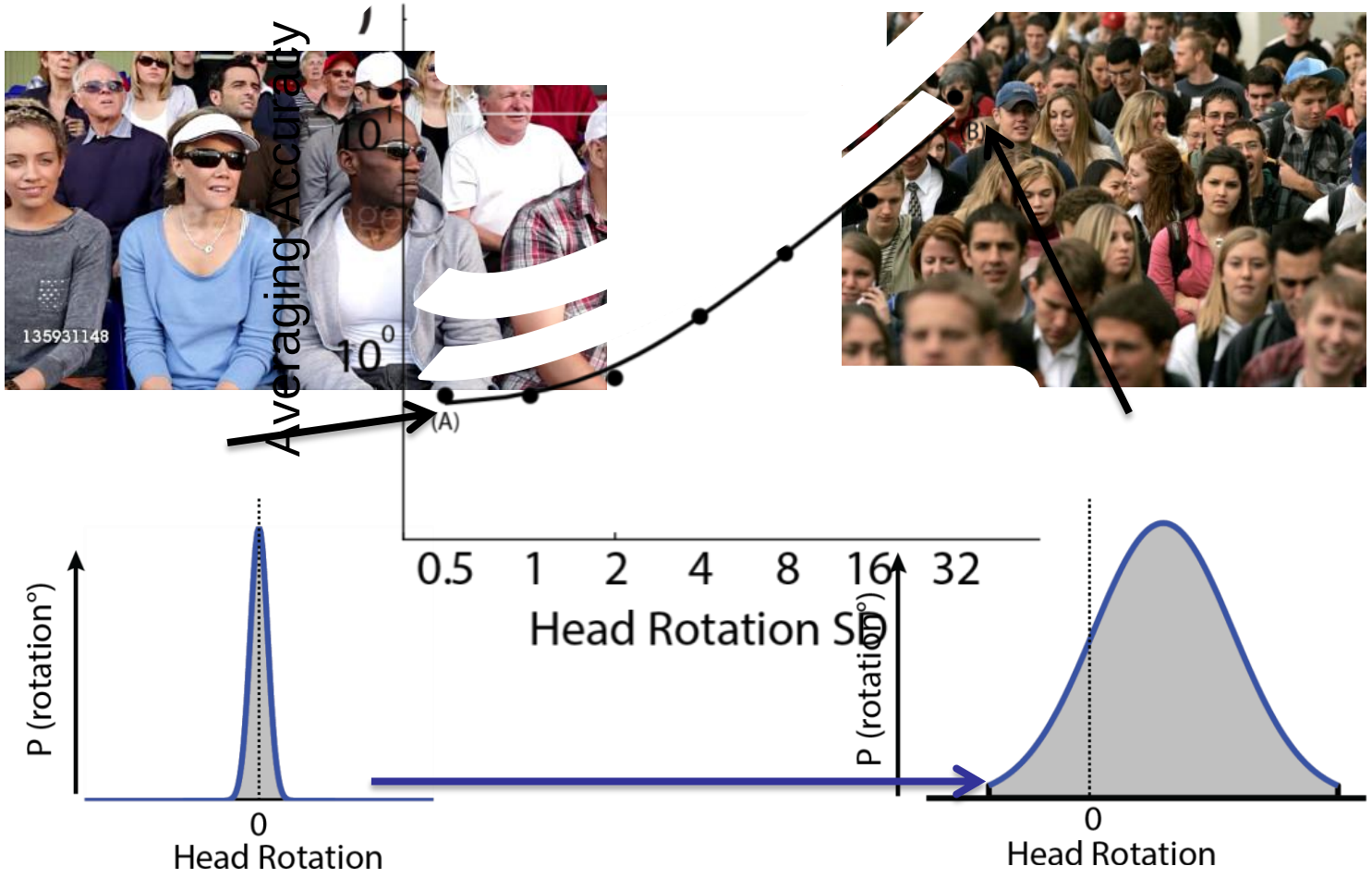
The uncertainty with which we judge a single element



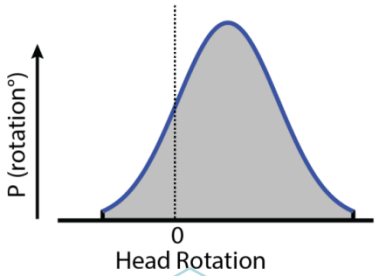
Sampling efficiency

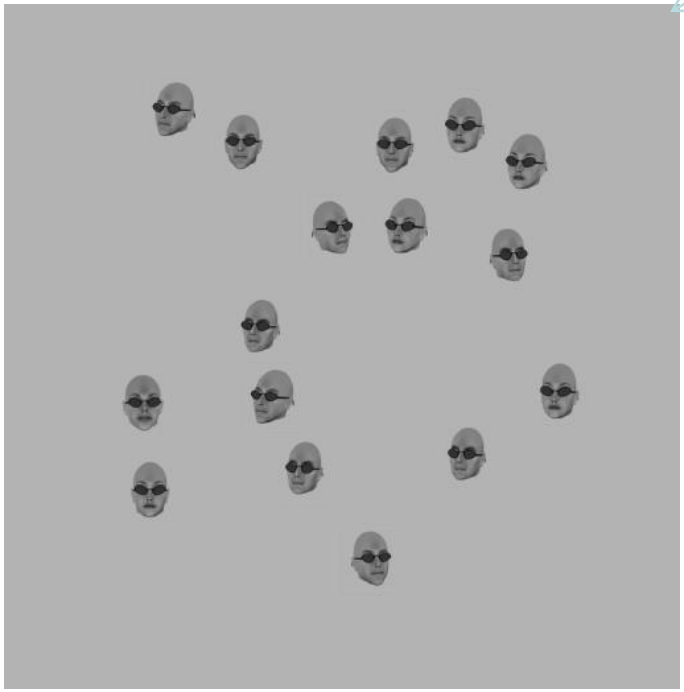
The number of elements we use in our average

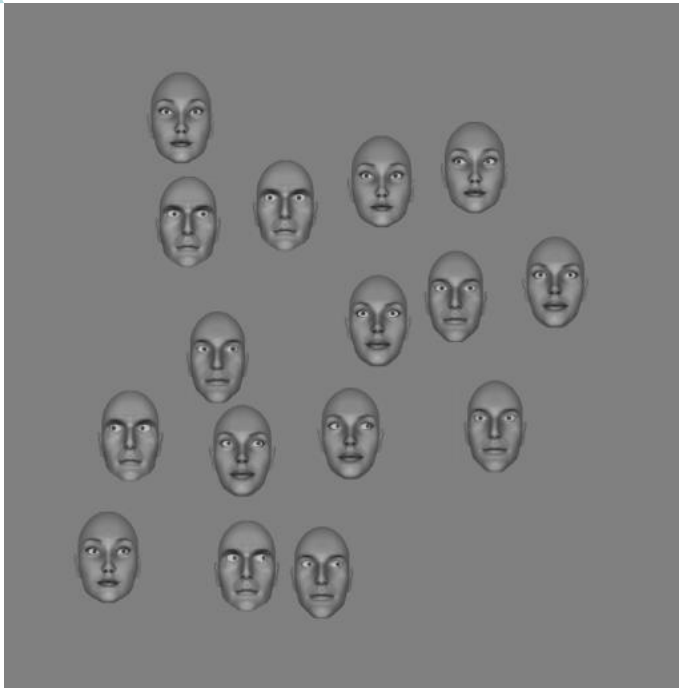
Equivalent noise



Stimuli



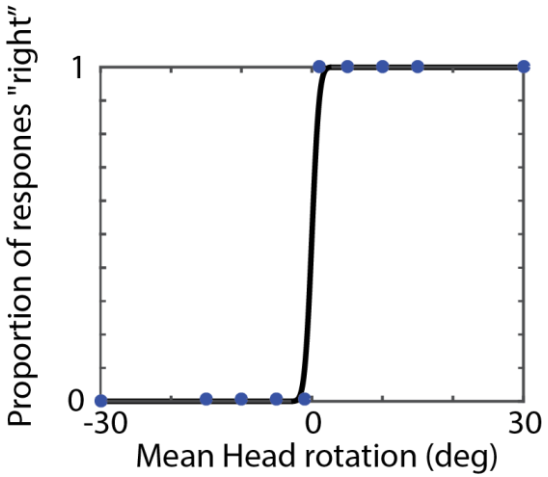




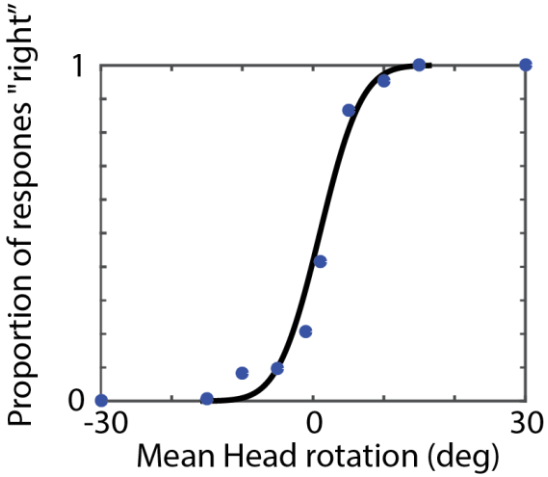
Measuring Accuracy

Task: Are the faces on average looking to your left or to your right (300ms presentation)?

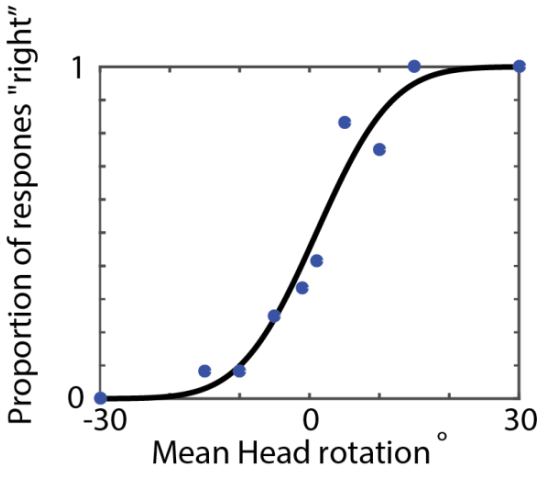
Perfect Performance



Low Uncertainty

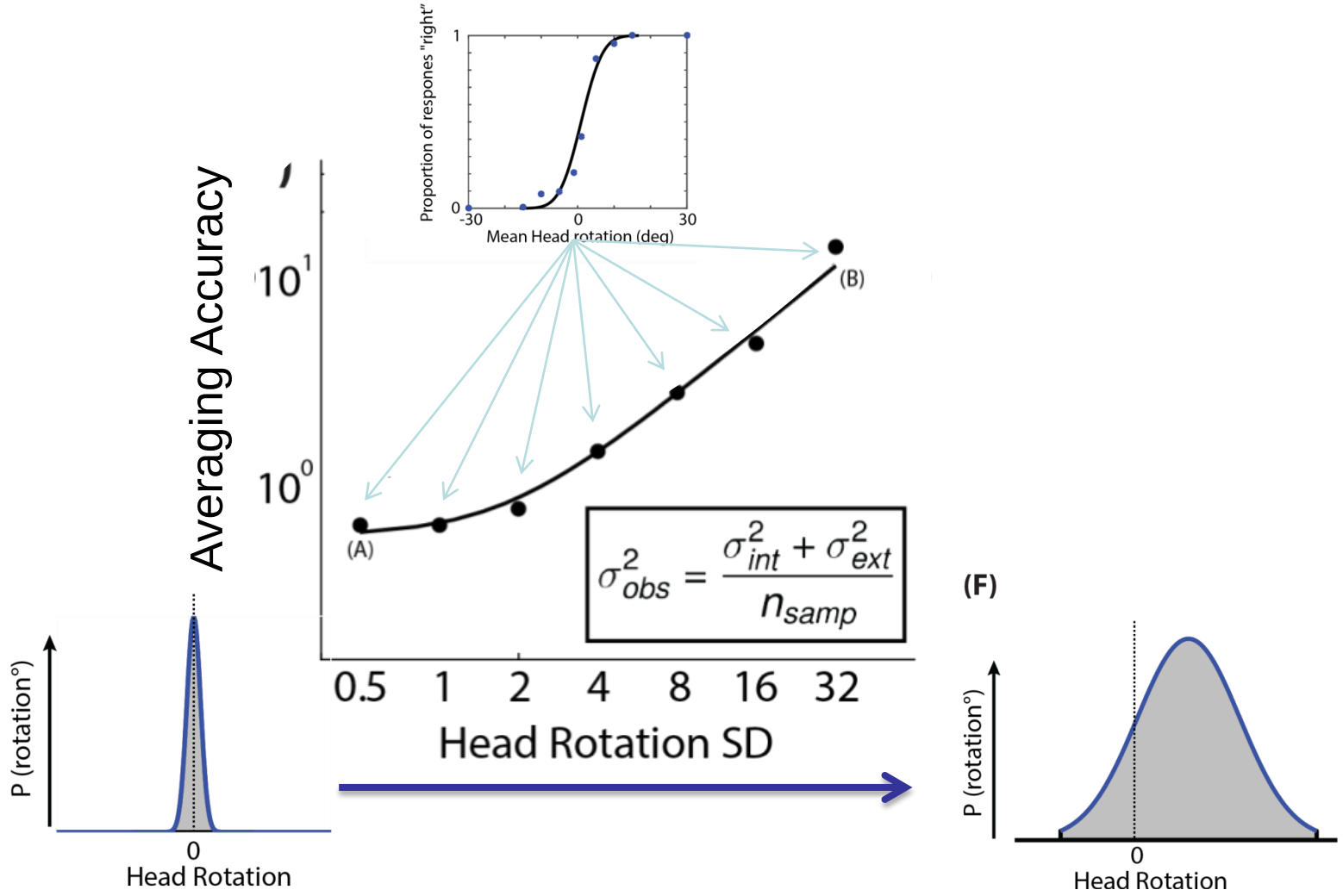


Higher Uncertainty

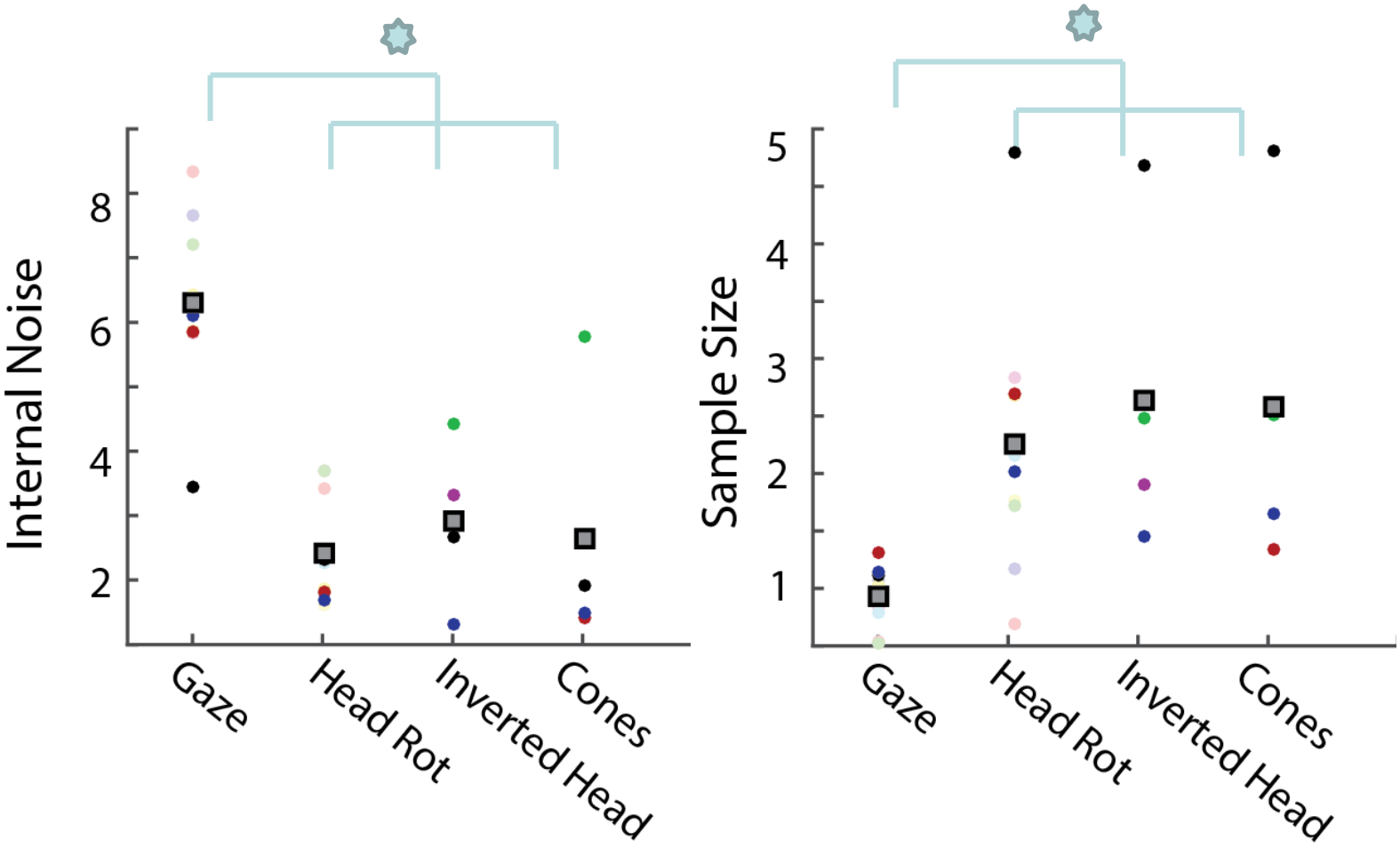


+ve =
Rightwards

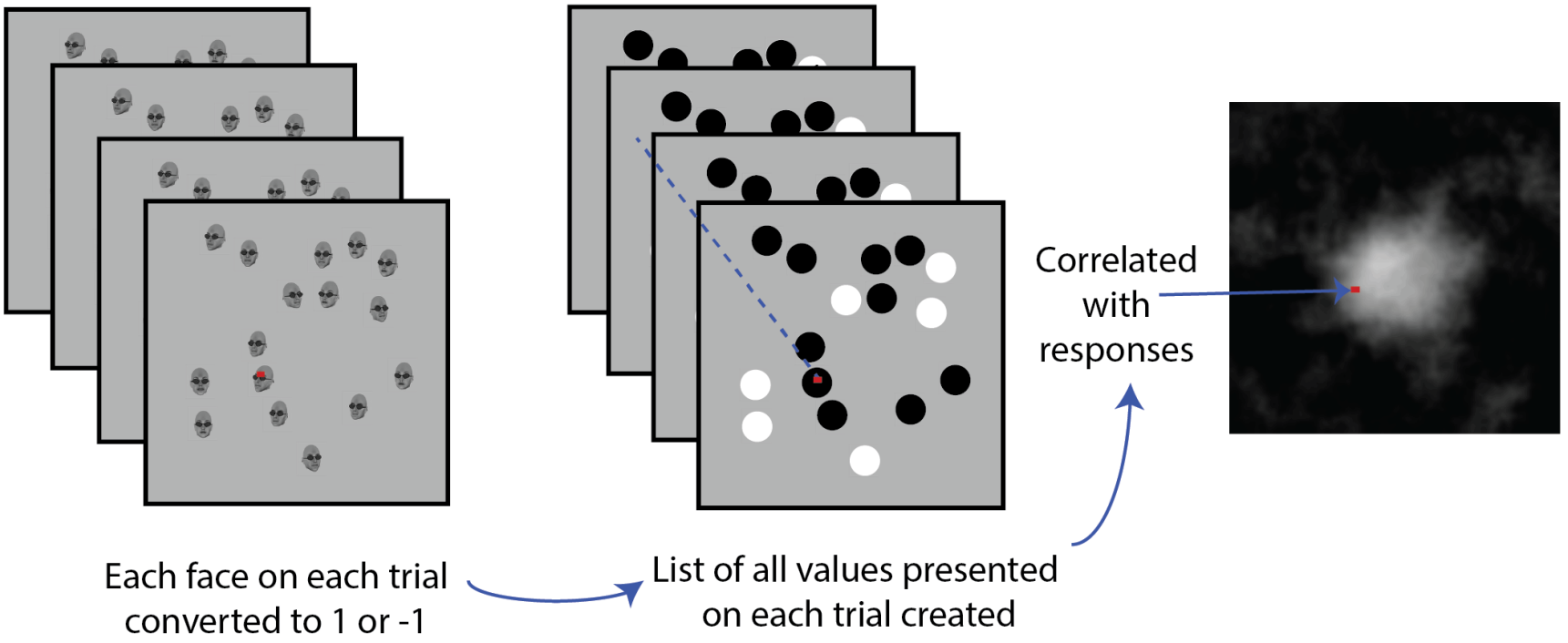
Equivalent Noise Fit

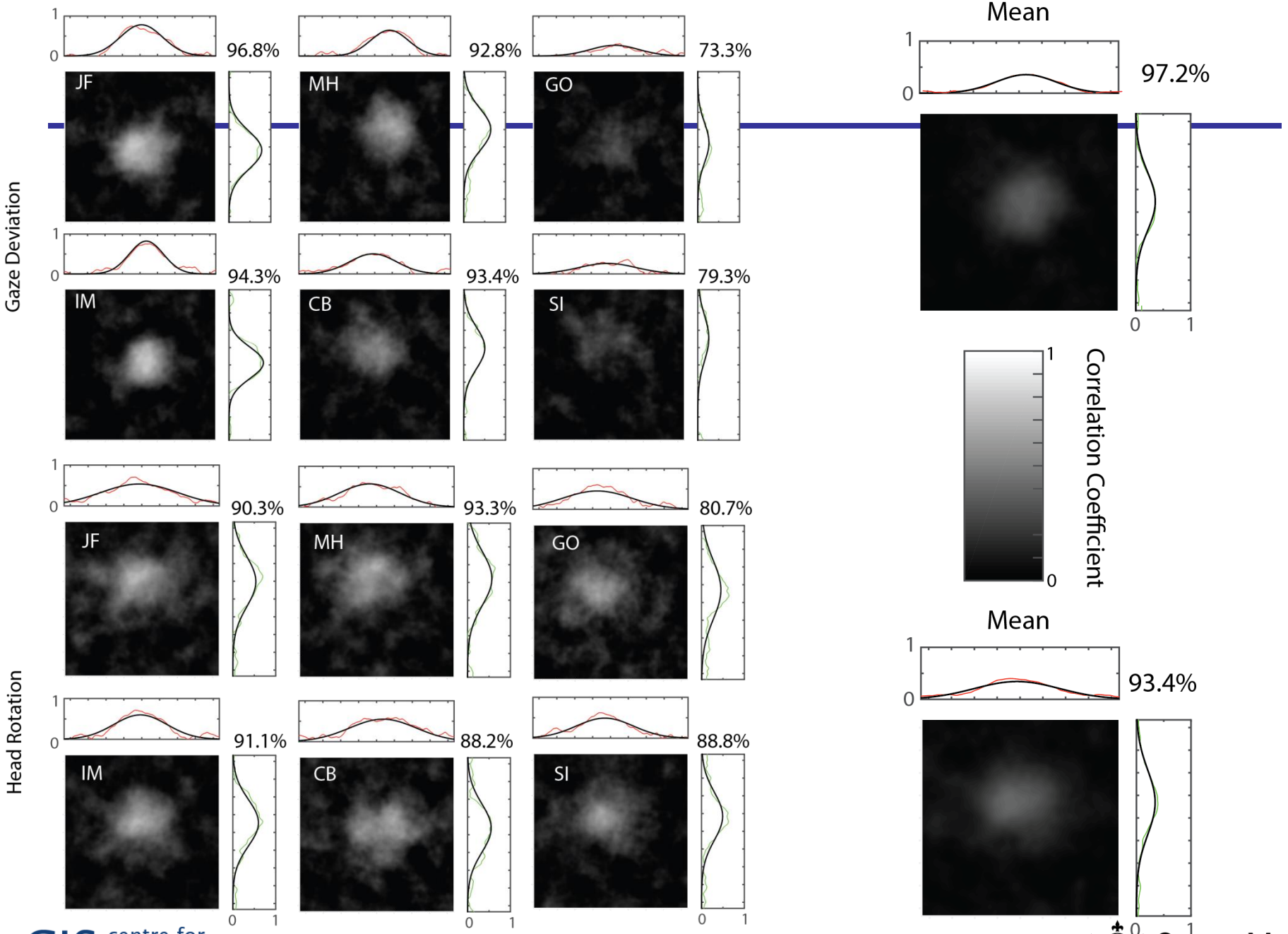


Results


Internal Noise
8
6
4
2
Gaze
Head Rot
Inverted Head
Cones
Sample Size
5
4
3
2
1
Gaze
Head Rot
Inverted Head
Cones

Reverse Correlation





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Conclusions

- We can average head rotation with less *internal noise* and greater *sampling efficiency* than gaze deviation
- We seem to be unable to average gaze deviation
  - Most likely due to limits of peripheral processing
- We are biased towards samples from the centre of a group
- When judging the direction of attention of a crowd we are most influenced by the head rotation of individuals towards the centre