In a typical visual working memory (VWM) study, subjects are asked to remember features of an object (e.g. color).

Yet, we know little about the memory of an object’s irrelevant features.

Given memory’s limited resources, it is vital to know what information is stored to fully understand memory’s capacity.

Memory storage hypotheses

- Object-based encoding (Eitam et al., 2015)
- An irrelevant feature memory is as precise as a relevant feature memory
- Only relevant memories (Awh et al., 2006)
- No memory of an irrelevant feature
- Coarse coding
- Coarse memory for an irrelevant feature

To test these models, we coupled delayed estimation with a surprise test (Rock et al., 1992)

**Experiment:**

- Participants instructed that only color is relevant

**Analysis:**

- Error = reported – presented
- σ and Pu (Zhang & Luck 2008)

**Results:**

- Variance in error across trials

**Predictions for irrelevant feature memory quality:**

- Narrow
- Uniform
- Broad

**Memory for relevant features:**

- Precise rep.
- Coarse rep.

Task relevant feature

Task irrelevant features

Stimulus

Color Shape Texture Size

**Memory for irrelevant feature:**

- Note: one data point per subject

- To determine whether this distribution is N, U, B, or some combination (e.g. NU, BU, or NB), we used maximum likelihood estimation

- 4 parameters were varied:
  - Width of a von Mises distribution — (σ, [1° to 180°, infl])
  - Width of a second von Mises distribution — (σ, [1° to 180°, infl])
  - Proportion of first von Mises — (P1: [0 to 1])
  - Bias of both von Mises distributions — (μ: [0° to 15°])

**Log likelihood (LL) function with μ fixed at 8°**

**Simulating Retrieval**

**Discussion:**

- Irrelevant features are encoded with reduced quality
- Increasing precision for one feature comes at the expense of other features
- This is true even for a set size of 1