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Does visual working memory rely on categorical and verbal neural representations?

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Abstract

Categorical biases in working memory (WM) can impact our recollection of visual stimuli. These are often biased towards or away from category prototypes. Color naming data can be used to predict biases in behavioral and neural data, suggesting sensory WM is affected by the use of verbal labels.

We investigated a possible link between categorical biases and verbal labels for orientation and spatial WM. Forty subjects performed standard orientation and spatial WM tasks, and were later prompted to freely label the stimuli.

Accuracy is significantly higher when recalling cardinal locations and orientations compared to non-cardinal ones. This contrast is also evidenced by subject-unique neural activity patterns. The behavioral error pattern resembled verbal labeling strategies: Terms for cardinal stimuli were used sparsely and precisely (e.g. vertical, horizontal) while terms describing non-cardinal stimuli were used liberally (e.g. diagonal). Cardinal biases in WM stimuli might result from the use of categorical, verbal representations.