

Humans Have Access to Probabilistic Information Stored in Working Memory

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Presentation Abstract Summary Current theories assume stimuli are stored in working memory as point estimates, for example the color value of a remembered item. Another possibility is that memory representations are richer, containing probabilistic information or a probability distribution over possible stimuli. To explore this, we conducted a psychophysical experiment where people remembered colors and reported both a continuous stimulus estimate and as well as a continuous measure of memory uncertainty through a post-decision wager. To further examine how people use memory uncertainty, we introduced expectations about colors by training subjects on two stimulus distributions, one where all colors are equally likely and one where some colors are more likely than others. When participants reported higher memory uncertainty, their error was higher, showing that people have meta-knowledge of memory quality. Moreover, when stimuli were from a non-uniform distribution, reports were biased towards the most frequent color, with the amount of bias increasing with reported uncertainty. This data is best explained by a model in which the working memory representation is continuous, variable, accessible to the observer and can be combined with other information. These results support that probabilistic information is stored in working memory and can be used to make decisions.

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