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Perceptual decision making from correlated samples

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Abstract: The optimal perceptual decision making strategy for weighting serially presented information depends on the degree of sample dependence. Uniform weighting produces optimal estimates from independent samples, but increases in autocorrelation should be matched by increasing and symmetric overweighting of early and late samples in order to maintain optimal performance.

In the current experiment, participants (N = 30) observed briefly presented sequences of eight dots and were asked to estimate their center of mass by dragging the cursor. The autocorrelation of the series was manipulated in two distinct blocks (either 0 or .7). Preliminary results show that the weight assignment to uncorrelated inputs did not differ significantly from the optimal uniform allocation. In contrast, in the high-dependence block participants used different weighting profiles - overweighting the first and/or last samples of the sequence. This suggests that humans flexibly adapt to changes in statistical structure in the predicted direction of optimality.