

**Figure S1. Relation between memory precision and the memory error distribution.** Left: Examples of Von Mises distributions, all with a mean of 0, but with three different values of the concentration parameter,  $\kappa$ . The higher the value of the concentration parameter, the more narrowly the memory error is centered around 0. Right: The relationship between memory precision (defined as Fisher information) and the concentration parameter of the memory error distribution. The mapping is approximately linear for large values precision, but nonlinear for small values (inset).