Modeling forward and backward serial recall using a spatial registry assumption

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Abstract: Inspired by recent observations of involvement of brain regions with visuospatial characteristics in mental tasks featuring memory manipulation, we offer a model based on a spatial registry of working memory items to explain the error patterns in both forward and backward recall. We hypothesize this spatial registry is made possible by recruiting visuospatial resources. This spatial registry facilitates selective processing of memory items determined by the algorithmic features of the mental task. We assume that retrieving working memory items from spatial registry locations is subject to errors which are determined by biological characteristics of a population encoding of spatial registry locations. In this model, spatial-temporal factors of the population encoding of space, captures the nature of visuospatial short-term memory. Our simulation results match both the positional and the displacement error distributions for forward and reverse recall tasks in addition to fill-in errors in forward recall.