Task complexity modulates trade-off between locomotion and working memory usage in a large copying paradigm

Our capacity to remember prior visual impressions is limited. Visual information can either be stored in working memory (WM) or recovered by refixating objects of interest. The balance between these two strategies depends on their costs for the observer. Overall costs may include metabolic costs for storing information, for redirecting attention, or perceptual load.
Much work has been done to investigate the trade-off between different costs for gaze movements. In a comparative visual search task reduced gaze movement patterns were found in conditions where costs for acquiring visual information were increased (Hardiess et al., *J. Vision*, 2008). Additionally, the balance point of the trade-off between gaze movements and WM was shifted towards increased memory use.
Here we tested the existence and properties of this trade-off with respect to costs for locomotion. Therefor, subjects had to copy patterns of colored blocks from a model area to a distant place – the workspace area (Ballard et al., *J. Cog. Neurosci*., 1995). Replicating the model, subjects could pick up one block at a time from a third place – the resource area. The three areas were arranged in an equilateral triangle. In a between subjects factorial design we varied the costs for locomotion (i.e. distance 2.25m vs. 4.5m) and the costs for WM load using two different complexities of block models (i.e. simple vs. complex).
The results reveal an increase of memory use (higher number of visits at model area) with longer walking distances. In addition, memory use is also elevated in the complex pattern conditions.