

Title: **The Dynamic Attentional Workspace Account**

Rob H.J. Van der Lubbe^{1,2}

¹ Cognitive Psychology and Ergonomics, University of Twente, Enschede, The Netherlands

² Laboratory of Vision Science and Optometry, Adam Mickiewicz University, Poznań, Poland

e-mail: r.h.j.vanderlubbe@utwente.nl

Abstract

The ability of primates and many other mammals to locate a predator (or a piece of fruit) implies a special role for space. Several theories about selective attention indeed reserve a special role for space. For example, it has been argued that selecting the location of an object (i.e., spatial attention) serves the goal of “selection for action”. Numerous studies demonstrated that selecting an object at a specific location facilitates actions towards that same location (i.e., the Simon effect). Moreover, several electrophysiological studies revealed strong similarities between spatial attention and preparing an action towards a specific location. Other studies noticed a strong coupling between auditory, visual, and tactile space, demonstrated by multiple crossmodal exogenous orienting effects. Recent studies additionally point to the similarities between external and internal spatial attention (retrieval of an object from short term memory). Electrophysiological studies revealed that attentional selection of an object at a specific location and retrieval of a previously presented object resulted in a similar reduction in lateralized alpha power. Finally, memorizing the serial order of centrally presented stimuli also seems to involve an internal spatial representation, which explains the success of the method of loci, already discussed by Cicero. Altogether, these findings point towards links between different sensory spaces, motor spaces, and a memory workspace, which may be accomplished by a supramodal spatial representation that resides in posterior parietal cortex. The links between the various spatial representations are thought to be dynamic, as certain conditions may imply a decoupling between different spatial representations. This idea is confirmed by electrophysiological results as “location selection” is reflected in a reduction of alpha power (interpreted as a release from inhibition) above different sensory but also motor areas, depending on the type of task.