Mechanisms of selective attention Woldorff MG Center for Cognitive Neuroscience, Duke University, Durham, NC, USA

At each and every moment of our lives, we are deluged with stimuli coming at us from a myriad of directions and through our various sensory modalities, much more than we can fully process. The cognitive function of attention allows us to continually select and extract from this deluge those inputs that are the most important and/or interesting so as to be able to accomplish appropriately full processing of those inputs. In this talk I will discuss, and present examples of evidence for, several fundamental mechanisms that appear to underlie attentional capabilities and functions. 1) The effects of attention on sensory and perceptual brain processing activity due to top-down attentional control. 2) The executive control of attention by higher level regions of the brain that accomplish this sensory processing modulation. 3) The modulatory biasing, also due to top-down attentional control, of the sensory cortices in preparation for the processing of sensory stimuli by those cortices. 4) The spreading of attention through multisensory objects.

The emphasis of the talk will be on visual spatial attention, but examples from auditory and multisensory attentional processes will also be included. The talk will discuss studies that have employed various of the main techniques for measuring brain activity non-invasively in humans during perceptual and cognitive processes – namely, the electrophysiological techniques of event-related potentials (ERPs) and magnetoencephalography (MEG) and the hemodynamic-based techniques of functional magnetic resonance imaging (fMRI) and positron emission tomography (PET). In addition, an emphasis will be placed on the importance of combining information from the electrophysiological and hemodynamic brain activity measures, with the aim of delineating both the functional neuroanatomy and the time course and sequence of the brain activations that underlie attentional and other cognitive processes.

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Speaker: Session 43 (Friday afternoon, 1PM), Attentional Control