visual marking, suggesting that the release of the inhibition by changing the color of old items and the attention capture by presenting a color singleton may use the same attention resources. Further fMRI experiments will be conducted to identify neural mechanisms underlying these two bottom-up disruptive processes.

B29

THE EFFECT OF NEGLECT ON IPSILESIONAL SPACE: A CASE STUDY *Alissa Wright[1], Bettina Olk[2], Joy Wee[3], Alan Kingstone[4]; [1]University of Toronto, [2]International University Bremen, [3]Queen's University, [4]University of British Columbia* – Although there is no primary system damage, patients with neglect fail to respond to stimuli on their contralesional side of space. To date, much of the research has concentrated on the contralesional deficits with little attention being committed to performance on the ipsilesional side of space, despite evidence that processing can be impaired ipsilesionally (e.g. alloaesthesia). In our study, 1 or 2 visual items were staggered between contra- and ipsilesional sides of space, and a neglect patient was asked to report how many items were presented and which side of space was stimulated first. As expected, the patient neglected contralesional items and, reflecting this deficit, he tended to guess that there was a contralesional item when none had occurred. Also as expected, the patient never neglected items that appeared ipsilesionally. However, unexpectedly, this patient often guessed that an item had appeared ipsilesionally when none had been presented. These findings suggest that while neglect itself is localized to the contralesional side of space, the spatial uncertainty that it generates occurs for both contralesional and ipsilesional sides of space.

B31

WHAT SHAPES THE FOCUS OF VISUO-SPATIAL ATTENTION? AN INTERPLAY OF MULTIPLE FACTORS. *Antje Kraft[1,2,3], Nele Pape[4], Herbert Hagendorf[3], Kerstin Irlbacher[1], Sein Schmid[1], Stephan A. Brandt[1]; [1]Department of Neurology, Charité, Berlin, [2]Department of Neurology II, Otto-von-Guericke University, Magdeburg; [3]Institute of Psychology, Humboldt University, Berlin, [4]Institute of Cognitive Science, University of Osnabrueck* – What determines the shape of visuo-spatial attention? Prior studies discussed visual field differences (Previc, Banich), task-difficulty dependences (Lavie) and the originator of the focus of attention (Slotnick). Here we introduce a psychophysical experiment considering all these aspects. In a matching task, 17 subjects compared two out of four stimuli regarding their identity. We analyzed the influence i) of distracter positions (peripheral, between attended positions, between fixation and attended position), ii) of distracters in easy and difficult tasks and iii) of stimuli alignment in the upper/lower or left/right visual fields on discrimination performance. Each subject performed all experimental conditions (4320 trials) allowing a direct comparison between conditions. Analysis revealed a bilateral field advantage indicating that more attentional resources are available when both hemispheres are involved. Furthermore a lower hemifield advantage was observed indicating a higher attentional resolution for the lower visual field. A significant interaction between task-difficulty and distracter position indicate that strongest interferences occurred in the easy task when distracters were aligned in the periphery. Least interference occurred when distracters were aligned between fixation and targets. In the difficult task no differences can be observed between these conditions. A unitary model of attention like the "zoom-lens-model" is not compatible with these results. We suggest that a model of visuo-spatial attention must consider differences in attentional resources and resolution (1 vs. 2 hemispheres, upper vs. lower visual field) and the type of task (easy vs. difficult, distracter position), as well as interactions between these factors.

B33

ATTENTIONAL MODULATION OF NEURAL RESPONSES TO ACTION OBSERVATION: IMPLICATIONS FOR MODELS OF THE HUMAN 'MIRROR' SYSTEM *Trevor Chong[1], Mark A. Williams[1], Ross Cunnington[2], Jason B. Mattingley[1]; [1]Cognitive Neuroscience Laboratory, School of Behavioural Science, University of Melbourne, [2]Howard Florey Institute, University of Melbourne, Australia* – Mechanisms underlying human action recognition are mediated by a network of cortical areas located within the premotor cortex, inferior parietal lobe and superior temporal sulcus. Current models suggest that activity within these regions arises relatively automatically during passive observation of meaningful actions, without the need for top-down control. Here we used functional magnetic resonance imaging to determine whether cortical activity associated with action observation is modulated by the strategic allocation of selective attention. Normal observers viewed brief movie clips of reach-to-grasp actions while performing a visual discrimination task at the fovea. The attentional demands of the central task were varied systematically to yield 'low' and 'high' load conditions, and the efficacy of these manipulations was verified behaviourally prior to scanning. Prior to the experimental runs, localiser scans were acquired to define functional areas involved in action observation. These areas were then used as regions-of-interest in subsequent analyses of the effects of the attentional task on neural responses to action observation. We also examined load-related activity changes within cortical areas responsive to visual motion, as a check on the effectiveness of the attentional task. Our results suggest that cortical areas involved in action observation are significantly modulated by attentional load. Thus, although the areas that encode meaningful actions can be engaged relatively automatically, it is clear that these regions are also influenced by the strategic allocation of selective attention. Our findings have important implications for recent attempts to link the human action-observation system to response properties of 'mirror neurons' in monkeys.

B35

NEURAL CORRELATES OF RAPID VS. DETAILED EVALUATION OF PHOBIA-RELEVANT STIMULI *Thomas Straube, Hans Mentzel, Wolfgang Miltner; Friedrich-Schiller-University Jena* – Using event-related functional magnetic resonance imaging brain activation to phobia-related pictures (P, spiders) and neutral pictures (N, mushrooms) was measured in spider phobic subjects and healthy controls under two task conditions. In the direct task, subjects were asked to identify the object (spider or mushroom) depicted in the pictures. In the highly demanding distraction task, subjects had to match geometric figures in the foreground of the pictures. In controls, there was no increased brain activation to P vs. N under any task condition. In contrast, phobics showed greater responses to P vs. N in the amygdala regardless of task, while insula and anterior cingulate gyrus (ACC) were stronger activated only during the direct task. The specific and pronounced amygdalar activation during attentional distraction suggests an import role of the amygdala in the rather automatic processing of phobogenic threat. In contrast, activation of areas such as the insula and ACC requires sufficient attentional resources. Our findings propose specific neural correlates for the rapid detection vs. the detailed processing of phobia-relevant threat.

B37

DISTINCT OBJECT-BASED EFFECTS DURING INITIAL AND REORIENTING SHIFTS OF VISUAL SPATIAL ATTENTION *Kevin D. Wilson[1], Kyle R. Schmidt[1], Katherine R. Gamble[1], Marty G. Woldorff[2], George R. Mangun[3]; [1]Department of Psychology, Gettysburg College, [2]Center for Cognitive Neuroscience, Duke University, [3]Center for Mind & Brain, University of California, Davis* – Functional neuroimaging has revealed a bilateral fronto-parietal network involved in the top-down deployment of visuospatial attention. Further, a right temporal-parietal region (rTPJ) is known to be engaged for reorienting attention to targets when prior cue information incorrectly predicts target location. Behavioral studies have shown that reorienting attention to an invalidly cued location within an object is faster than reorienting attention to an equidistant location within a different object. These "object-based" effects have been demonstrated repeatedly for reorienting shifts of attention, suggesting the involvement of rTPJ. It is unclear, however, whether similar object-based effects are associated with top-down fronto-parietal attentional control

ting of the oculo-motor system leading to an improvement in high-order visuo-spatial representation able to ameliorate neglect.

B19

INTERHEMISPHERIC COLLABORATION: EFFECTS OF MIXING STIMULUS FORMAT *Urvi Patel, Joseph Hellige; University of Southern California* – The present research examined the effects of mixing stimulus format on interhemispheric collaboration. Observers were presented with three stimuli, two located above the point of eye fixation (one to each visual field) and the third located below the point of fixation (to one visual field). Observers indicated whether the bottom stimulus represented the same numeric quantity as either of the top two stimuli. In the digits only condition, all three stimuli were digits and in the dots only condition, all three stimuli were dice-like dot patterns. In the mixed format condition, two digits appeared in the upper locations and a dot pattern appeared in the lower location. In order to compare the benefits and costs of distributing information across the two hemispheres, the critical comparison involved trials on which the two matching stimuli project to the same visual field (within-hemisphere trials) versus trials on which the two matching stimuli project to opposite visual fields (between-hemisphere trials). For both reaction time and error rates there was a within hemisphere advantage for the digits only condition and for the mixed format condition, despite the fact that this task could not be performed on the basis of physical identity. In contrast, there was a between hemisphere advantage for the dots only condition, despite the fact that this task could be performed on the basis of physical identity. This pattern of results indicates that the benefits of spreading processing across both hemispheres do not necessarily increase as the task becomes more complex or demanding.

B21

CONTINUOUS FLASH SUPPRESSION: STRONG DICHOPTIC MASKING CAN REDUCES NEGATIVE AFTERIMAGE *Naotsugu Tsuchiya, Christof Koch; California Institute of Technology* – Visual illusions that produce perceptual suppression despite constant retinal input, such as masking, binocular rivalry, and flash suppression, are used to study the neuronal correlates of consciousness. Here we report on a novel perceptual suppression technique, continuous flash suppression (CFS): continuously flashing different images at around 10Hz into one eye can suppress a constant image presented to the other eye in a reliable and sustained manner. Unlike flash suppression, it does not require pre-exposure of the target stimuli to achieve reliable disappearance, making CFS attractive for studies that require complete unawareness of the target. First, we compared the mean initial suppression duration without pre-exposure of the target (n=17) using binocular rivalry and CFS. The suppression lasted only 4.3 sec in binocular rivalry, while it was prolonged into 56.0 sec in CFS, increase of more than 10-fold. Using this tool, we re-examined the question of the neuronal sites underlying the perception of negative afterimages. Though it is widely believed that afterimages originate among retinal neurons, we show that the subjective rating of strength of the afterimages of colored isoluminant Gabor patches was reduced almost by half when the inducing image was masked with CFS (but was physically present throughout the adaptation period on the retina). Further experiments showed that the stronger the suppression of the adapting stimuli, the larger the reduction of afterimage intensity. Our results imply that the representation of negative afterimages must involve structures that have access to input from both eyes.

B23

PARIETAL MEDIATION OF ATTENTIONAL SELECTION IN COMPETITIVE VISUAL DISPLAYS *Jason Mattingley, Christopher Chambers, Natasha Janko, Mark Stokes; School of Behavioural Science* – Typical visual scenes contain more information than can be used to guide behaviour. Mechanisms of selective attention enhance neural processing of the most relevant stimuli, while simultaneously suppressing distracting information. Multiple lines of evidence suggest that the human parietal cortex is vital for attentional control, but the role of specific subregions in mediating competitive selection is unclear. The present study used transcranial magnetic stimulation (TMS) to determine the role of the inferior and superior parietal cortex in visual selective attention. Participants undertook a localization task in which a visual target could occur alone or with competing distractors in the opposite hemifield. Event-related TMS was delivered during the first 300ms of target processing, over the superior parietal lobule (SPL), angular gyrus (AG) or supramarginal gyrus (SMG) of the right hemisphere. Results indicated that disruption of the SPL and SMG reduced attentional competition. Specifically, TMS of these regions 120ms after target onset improved perception of targets in the right hemifield, but only when the targets occurred with contralateral distractors. These results indicate that TMS selectively impaired distractor processing, thus reducing attentional competition between visual representations. The early involvement of the SPL and SMG places these regions in an ideal position to modulate sensory processing in visual cortex, thus determining which stimuli will win the competition for selection.

B25

DYNAMICS OF MOTION PERCEPTION IN OBJECT-SELECTIVE ATTENTION *Peng Wang, Zu Xiang Liu, Lin Chen; Key Lab of Cognitive Science, Graduate School & Institute of Biophysics, Chinese Academy of Sciences* – It was reported that when subjects attended to motion defined object, the attention effects to the irrelevant color in the object would activate the same area as the its sensory onset do, with a few tens of milliseconds lag (Schoenfeld et al., 2003). Then it would be interesting to investigate the reverse: when subjects were directed to attend objects cued by color, how are the dynamics of sensory onset and attention modulation of motion. In this study, subjects were directed to view a set of randomly distributed gratings and perform a task related to their color, when event related potentials (ERP) were recorded. The gratings may be stationary or moving in various trials. The result from nine subjects showed that the temporal relationship between sensory onset and attention modulation of motion was similar as color, but differed in span. Dipole fitting suggested the anatomical sensory-attention relationship in motion was not same as color, which still need to be confirmed by further MRI test. Acknowledgement: This work was supported in part by the Ministry of Science and Technology of China (2004CB318101) and the Chinese Academy of Sciences (KGCX2-SW-101). Reference: Schoenfeld, M. A., Tempelmann, C., Martinez, A., Hopf, J. M., Sattler, C., Heinze, H. J., et al. (2003). Dynamics of feature binding during object-selective attention. Proc Natl Acad Sci U S A, 100(20), 11806-11811.

B27

COLOR SINGLETONS DISRUPT THE PREVIEW BENEFIT OF VISUAL MARKING *Yong Bu[1], Qi Zhu[2], Ke Zhou[1], Jia Liu[1]; [1]The Key Lab of Cognitive Science, Graduate School & Institute of Biophysics, Chinese Academy of Science, [2]Department of Psychology, Beijing University* – If a subset of distractors is previewed before the target and the remaining distractors, search efficiency is greatly improved. The process that eliminates old items from search is called visual marking. Recent studies show that the color change of old items impairs the preview benefit, suggesting that the inhibition on the location of old items can be overridden by bottom-up visual changes. Here we ask whether bottom-up visual changes occurring at an un-marked location can disrupt visual marking as well. To answer this question, we orthogonally manipulated locations where bottom-up changes could occur by either changing the color of all old items or changing the color of a new item (i.e. a color singleton) in a 2x2 design. Consistent with the previous reports, the reaction time was significant delayed when the color of old items changed, compared to when the color did not change. Further, the reaction time was significantly longer when a color singleton appeared, suggesting that the disruptive bottom-up visual changes are not necessarily location-specific. Most importantly, a significant two-way interaction of color change of old items by appearance of a color singleton revealed that when a color singleton was present, the color change of old items did not further disrupt