are of equal strength, the MAE is unaffected by attention instructions. We argue that attention modulates the adaptation resulting from a particular motion component not directly, by enhancing or inhibiting particular motion vectors per se, but instead influences MAE indirectly, by enhancing or inhibiting entire surfaces.

- **Short-term and long-term effects of shifting visuo-spatial attention at the visual field border of brain-lesioned patients**

D A Poggel¶§, E Kasten§, E M Mueller-Oehring§, H Strasburger¶, B A Sabel§
(¶ Generation Research Program, Ludwig-Maximilians-Universität München, Arzbacherstrasse 12, D 83646 Bad Tölz, Germany; § Institute of Medical Psychology, Otto-von-Guericke-Universität Magdeburg, Leipzigerstrasse 44, D 39120 Magdeburg, Germany; e-mail: poggel@grp.hwz.uni-muenchen.de)

Visuo-spatial cueing of attention improves visual information processing in normally sighted subjects, particularly at threshold. A special cueing procedure was designed to help patients with visual-field defects shift their focus of attention at the visual field border, to investigate whether residual vision can be activated during visual-field testing (short-term effects) and visual-restitution training (long-term effects), respectively. In visual-field tests with versus without visuo-spatial cueing, we found a short-term increase of stimulus detection and decrease of reaction times in valid trials, but also unspecific benefits in invalid trials. This effect depended upon the size of areas of residual vision—patients with 'soft' field borders showed more improvement. Long-term effects of attention were investigated in a training study comparing conventional visual-restitution training and attention field training (with visuo-spatial cueing). Restitution training resulted in a highly significant increase of stimulus detection performance and a shift of the visual-field border when data of all patients were analysed. Moreover, the cue in the attention-field training changed spatial and temporal patterns of visual-field recovery. Thus, visuo-spatial attention not only activates residual vision of brain-lesioned patients on a short-term scale but also influences long-term neuronal plasticity.