

# **Spatio-temporal topography of saccadic suppression and perisaccadic temporal order perception**

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Visual perception is modulated during saccadic eye movements. Contrast thresholds for the detection of luminant visual stimuli are significantly increased briefly before, during and after saccades. Previous studies measured the temporal evolution of this suppression but did not investigate any position dependency. Accordingly, in our current study we explored the contrast threshold for visual stimuli presented during saccades at different positions in the visual field. Eye movements were recorded in human subjects with an infrared eye tracker (EyeLink 2, SR-Research) running at 500 Hz. Visual stimuli were presented on a CRT monitor or on a large tangent screen in front of the subjects who initially fixated a target left from the center on the horizontal meridian. 500 to 1000 ms after trial onset, the fixation target was switched off and a saccade target appeared right from the vertical meridian. Visual stimuli were presented perisaccadically for 10ms at different positions in the visual field.

The detection rate of stimuli was reduced during saccades as compared to steady fixation. However, this reduction was not constant across space but increased with retinal eccentricity. Also the time of peak saccadic suppression turned out to be a function of stimulus position within the visual field. Maximum suppression occurred earlier at and near the saccade target as compared to regions at and around the initial fixation target. We developed a numerical model to get a better insight into the underlying neural processes. In essence, our model combines previously described psychophysical data on retinal contrast sensitivity and perisaccadic shifts of attention. Based on our model data we conclude that visual perception is perisaccadically suppressed at a global scale. The observed spatio-temporal topography of saccadic suppression most likely results from the eye movement dependent stimulus eccentricity and additional attentional effects.

Supported by: Deutsche Forschungsgemeinschaft (GRK-885) and EU (MEMORY)