

Abstract

In this thesis, my basic research on eye movements during scene perception is reported. The specific aspects under scrutiny arose from the insight that there is a considerable number of elementary factors whose influence on eye movements have been largely ignored in the studies to date.

In Experiment 1, the effect of image size on saccade amplitudes was investigated. In a recognition task, 48 participants viewed 96 colour scene images scaled to four different sizes, while their eye movements were recorded. The analyses revealed that mean and median saccade amplitude are directly proportional to image size, while the peak of the distribution lies at the lower end of the range of detectable saccades. However, image size does not significantly change the course of saccade amplitudes over the total viewing time. Irrespective of image size, saccade amplitudes initially increase and then gradually decrease. Moreover, a meta analysis was performed in which mean saccade amplitudes reported in earlier image perception studies were summarised. Overall, the results strongly suggest that, as far as mean and median saccade amplitudes are concerned, the size of stimulus images is the dominant factor. Other factors such as image type and content, viewing task, or measurement equipment, only are of subordinate importance.

The aim of Experiment 2 was to assess the influence of viewing task and stimulus repetition on basic oculomotor measures and the spatial pattern of fixations. Fifty-four participants were assigned to three groups which received different viewing instructions, free viewing, preparation for a recognition task, or a detail memory task. Forty-eight scene images were presented twice, with a delay of 20 minutes in-between. Of these three tasks, the recognition task caused longer fixation durations, a higher similarity of spatial fixation patterns between the first and second viewing, and a higher between-participant similarity of fixation patterns. This indicates that the viewing strategies adopted by the participants play a crucial role, as these results cannot be interpreted based on memory load effects alone. Regarding the effects of stimulus repetition, longer fixation durations and shorter saccades during the second presentation were observed. Moreover, results from both experiments underline that several aspects of oculo-motor behaviour are not constant over the time a scene image is examined; the behaviour seems to be of a different quality during the first one or two seconds.

The present work indicates that many basic parameters are more important than previously thought, and pertain to theoretical as well as methodological issues. In extrapolation, this suggests that all these factors, and several more, which are irrelevant when using 2D computer displays, will also have to be considered in the next, logical step, that is when taking scene perception studies into the real world.