

超短潜時サッカード誘発のためのファジービジョン方略

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Fuzzy Vision Strategies for Evoking Express Saccades

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Abstract

The purpose of this study was to examine if the express saccades can be evoked by means of the active control of spatial attention and how the saccadic reaction times (SRTs) affect the timing error of coincident responses.

Four male subjects each participated in seven kinds of tasks consisting of eight blocks of 30 trials. In the beginning, the subjects kept gazing at a fixation point on the right side of a computer monitor. When a target began to move horizontally from a starting point (near or on the fixation point) to left at a constant velocity, they made a saccadic eye movement to pursuit it as quickly and accurately as possible. After then, they pressed a push button at the moment they supposed that the target arrived just at a given point through a masking zone making it invisible. Seven visual stimulus patterns consisted of three conditions (Fixation, Overlap, and Gap task) in the previous study (Park & Yoshida, 2000) and four more conditions leading to fuzzy vision strategies, such as Fixation and crossed double image, Overlap and crossed double image, Overlap and blur image, and Overlap and pile image task. Fuzzy vision strategies make low state of focused spatial attention by separating a viewpoint from a visual target, with making it blurry and/or double imaged, and have possibility to evoke the express saccade easily.

The repeated-measured one way ANOVA was employed to analyze SRTs and the absolute and constant errors of anticipated responses to the seven tasks. The correlation analysis was performed to examine the training effect on SRTs to the moving targets in each seven tasks. As a result, Overlap and blur image task showed saccades with extremely short reaction times, small absolute errors, and stable constant errors close to zero.

Such fuzzy vision strategies, in contrast with clear vision strategies, would make it easy to control spatial attention and viewpoint in a natural and active manner, and then improve motor performance in sports.

Key words : Fuzzy vision strategy, express saccade, saccadic reaction time, spatial attention, coincident timing