

Human Eye-Head Gaze Shifts in a Distractor Task. II. Reduced Threshold for Initiation of Early Head Movements

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This study was motivated by the observation of early head movements (EHMs) occasionally generated before gaze shifts. Human subjects were pre-sented with a visual or auditory target, along with an accompanying stimulus of the other modality, that either appeared at the same location as the target (enhancer condition) or at the diametrically opposite location (distractor condition). Gaze shifts generated to the target in the distractor condition sometimes were preceded by EHMs directed either to the side of the target (correct EHMs) or the side of the distractor (incorrect EHMs). During EHMs, the eyes performed compensatory eye movements to keep gaze stable. Incorrect EHMs were usually between 1 and 5° in amplitude and reached peak velocities generally 50°/s. These metrics increased for more eccentric distractors. The dynamics of incorrect EHMs initially followed a trajectory typical of much larger head movements. These results suggest that incorrect EHMs are head movements that initially were planned to orient to the peripheral distractor. Furthermore gaze shifts preceded by incorrect EHMs had longer reaction latencies than gaze shifts not preceded by incorrect EHMs, suggesting that the processes leading to incorrect EHMs also serve to delay gaze-shift initiation. These results demonstrate a form of distraction analogous to the incorrect gaze shifts (IGSs) described in the previous paper and suggest that a motor program encoding a gaze shift to a distractor is capable of initiating either an IGS or an incorrect EHM. A neural program not strong enough to initiate an IGS nevertheless can initiate an incorrect EHM.