

On gaze agency

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We define gaze agency as the awareness of the causal effect of one's own eye movements on the physical world, which might soon become a reality with the diffusion of gaze-operated devices. Here we propose a method to assess gaze agency by evaluating self-monitoring propensity and sensitivity. In one task, healthy adult observers watched bouncing balls on a computer monitor, with the goal of discovering the cause of concurrently presented beeps, which were generated in real time by their spontaneous saccades or by external events (Discovery task, propensity). An ad-hoc index was developed to measure the performance in this task. In a second task, observers judged whether or not the beeps depended on their eye movements (Detection task, sensitivity). Signal detection indexes were used to measure the performance in this task. We analyzed observers' eye movements in search of an oculomotor signature of gaze agency, but in neither tasks we found relevant task-related changes in the visual exploration pattern. Our approach has three strengths: 1) is based on a continuous and spontaneous action source – eye movements; 2) involves both cognitive and sensori-motor capabilities – understanding an action at a distance; 3) probes self-monitoring propensity, which is difficult to assess with traditional tasks based on bodily agency. Assessing gaze agency may deepen our knowledge of defective agency in pathological conditions and during development.