Dissociating the roles of spatial position within the visual field and the implied destination of a moving object in the perceptual-motor congruence effect known as the Simon Effect

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When responding to a non-spatial attribute of a stimulus, such as its color, the spatial position of the stimulus affects the response, despite being task irrelevant. Specifically, responses tend to be faster and more accurate when the stimulus is on the same side as the responding effector (*congruent*) than when they are on different sides (*incongruent*). This pattern of results, known as the *Simon Effect*, reflects processing interactions between spatial codes associated with the response and spatial codes associated with the stimulus, and has been used to study the relationship between motor affordances and visual processing. We asked whether the relevant spatial code of the stimulus is position in the visual field or whether, in the case of a moving stimulus, its apparent destination, which is especially relevant to visuomotor coordination. Using virtual reality, we presented spheres that originated on the left or the right side of a virtual environment and moved toward the participant in a trajectory that headed either to the hand on the same side (*straight motion*) or to the hand on the opposite side (*crossed motion*). The spheres began as gray and changed to either blue or orange after 200ms. The task was to report the color as quickly and accurately as possible by making a left or right manual trigger response. Trials on which responses were made after the sphere crossed the midline were excluded from analyses so that, regardless of the trajectory condition, stimuli appeared only on the side of origin. Responses were faster when the apparent destination of the moving sphere was the responding hand than when it was the opposite hand. This was true regardless of the side of origin. These results are consistent with the Simon Effect reflecting interactions associated with perceptual-motor coordination.