Induced motion in depth with perspective and binocular disparity cues

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Abstract

An object-centric reference frame is a spatial representation in which objects or their parts are coded relative to others. Object-centric representations are illustrated by the phenomenon of induced motion, in which the motion of an inducer frame in a particular direction induces motion in the opposite direction in a target dot. We report on an experiment made with an induced motion display, where critically a degree of slant is imparted to the inducer frame using either perspective or binocular disparity depth cues. Participants matched the perceived induced motion in depth using a 3D rotatable rod. Initial results indicated that, although the frame had no global motion in depth, subjects perceived the dot as moving in depth, either along the slanted frame (motion assimilation in depth) or against it (induced motion in depth), when depth was given by perspective or disparity, respectively. However, rather than demonstrating induced motion and motion assimilation in depth, it is possible to explain these findings on the basis of (1) a weak percept of frame slant in the perspective conditions – such that the target is perceived as moving along a flat frame – and (2) observer bias for target motion in depth in the disparity trials. To control for the first confounding factor, in the current experiment, participants adjust the perspective cue in trials that have no disparity cue, with the goal of giving the inducer frame a similar degree of slant regardless of the type of depth cue. Furthermore, the presence of observer bias is measured in an additional set of trials in which subjects indicate their percept of motion in depth when viewing a target dot that oscillates horizontally on the frontal plane.

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