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Illusory scene shearing during real and illusory self-rotations in roll

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Abstract

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S2D-01: Illusory scene shearing during real and illusory self-rotations in roll**Stephen Palmisano**

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Contrary to long-held assumptions, perceived scene rigidity is not essential for visually induced illusions of self-motion (i.e.vection). Rollvection can be induced by rotating a large homogeneous textured display relative to the upright observer. Under these conditions, the continuous rollvection experienced is paradoxically accompanied by maximum perceived self-tilts of less than 20° (e.g. Howard, Cheung, & Landolt, 1989). By contrast, Ian Howard's fully furnished tumbling room apparatus can induce highly compelling illusions of 360° (i.e. head-over-heels) self-rotation. We have found that both real and illusory tumbling in his room are accompanied by dramatic illusory scene distortions (scenery near the observer's fixation location sometimes leads and other times lags their more peripheral scenery). The fact that these scene distortion and self-motion illusions co-occur so successfully is both intriguing and a major challenge to existing theories of self-motion perception. Our research has eliminated explanations of these illusory scene shearing effects based on eye-movements, distance misperception, peripheral aliasing, differential motion sensitivity and adaptation. Intriguingly, we have consistently found that perceived head-over-heels tumbling (either real or illusory) is the essential prerequisite for the scene shearing illusion.