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Reduction of the elevator illusion from continued hypergravity exposure and visual error-corrective feedback.

Welch RB, Cohen MM, DeRoshia CW.

NASA-Ames Research Center, Moffett Field, CA 94035-1000, USA. robert-welch@qmgate.arc.nasa.gov

Ten subjects served as their own controls in two conditions of continuous, centrifugally produced hypergravity (+2 Gz) and a 1-G control condition. Before and after exposure, open-loop measures were obtained of (1) motor control, (2) visual localization, and (3) hand-eye coordination. During exposure in the visual feedback/hypergravity condition, subjects received terminal visual error-corrective feedback from their target pointing, and in the no-visual feedback/hypergravity condition they pointed open loop. As expected, the motor control measures for both experimental conditions revealed very short lived underreaching (the muscle-loading effect) at the outset of hypergravity and an equally transient negative aftereffect on returning to 1 G. The substantial (approximately 17 degrees) initial elevator illusion experienced in both hypergravity conditions declined over the course of the exposure period, whether or not visual feedback was provided. This effect was tentatively attributed to habituation of the otoliths. Visual feedback produced a smaller additional decrement and a postexposure negative after-effect, possible evidence for visual recalibration. Surprisingly, the target-pointing error made during hypergravity in the no-visual-feedback condition was substantially less than that predicted by subjects' elevator illusion. This finding calls into question the neural outflow model as a complete explanation of this illusion.