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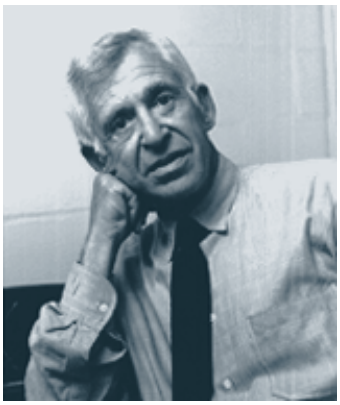

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Development and Maintenance of Spatially Coordinated Behavior

Sensation arising in the muscles, joints, and tendons adds to that provided by vestibular input to inform the organism of its orientation in gravity space and to allow it to relate the position of body parts with respect to each other. Such sensory input also interacts with that provided through other sensory systems to locate the depth, direction, and movement of objects in visual and auditory spaces. Vibratory stimulation applied to muscles and tendons (especially those implicated in eye, neck, and postural adjustments) activates stretch receptors and alters the perceptual consequences of visual and auditory input. Studies of visual and auditory illusions induced by vibratory stimulation are undertaken for their own sakes, and are exploited as well for the insights they provide to the normal interaction of somatic sensation with that from the distance receptors.

The contribution of the oculomotor system to the acquisition and maintenance of visually guided behavior is being examined in cats. Surgical immobilization of an eye in dark-reared kittens precludes development of guidance when the paralyzed eye is provided exposure in light. Light-reared animals retain visual guidance following eye immobilization surgery. Similarly, when proprioception from ocular musculature is surgically interrupted in dark-reared kittens, they fail to acquire visually guided behaviors when later exposed in light. The findings imply that both visually elicited eye movements and proprioception from the extraocular muscles are essential to acquisition of visually guided behaviors, while their role is reduced following this development.

In related studies optokinetic nystagmus in the ferret is being compared with that in the cat, with the ferret showing eye movement responses to significantly higher velocities of visual motion. Responsivity of the oculomotor apparatus of this carnivore recommend it for further study of visual-motor integration. One such exploration is examining the consequences for visually initiated eye movements of rearing ferrets in special environments.

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