



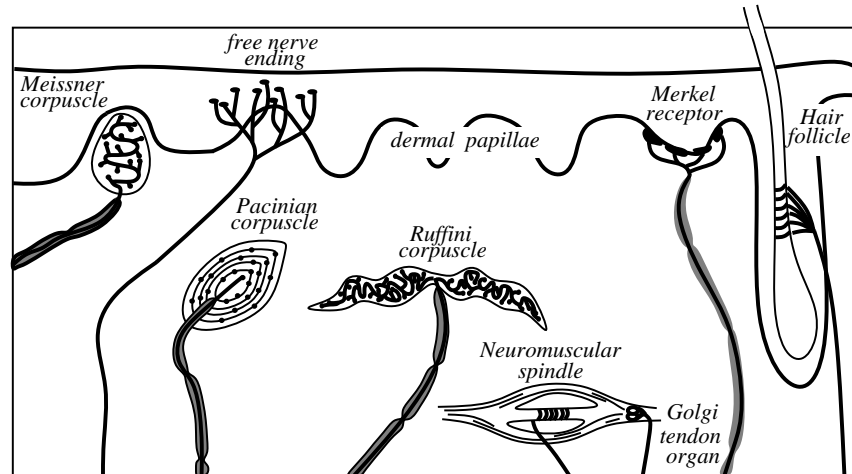
Sources of Inspiration

- Psychological Models
- Ethological Models
- Physiological Models
- Neuroscientific Models



The Neuroscience of Behavior

The Peripheral Nervous System

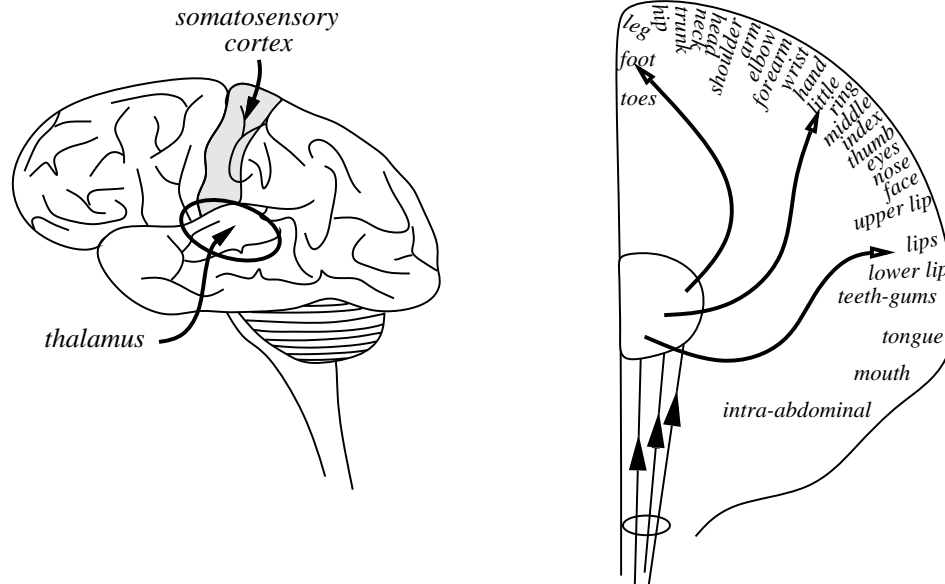


- variable response and sensitivity, massive redundancy
- *touch blend* interpretation over multi-sensory signals
- relatively slow signal propagation compared to motor neurons (from 2 – 80 *m/sec*, as compared to about 100 *m/sec* for motor signals)



The Neuroscience of Behavior

The Somatosensory Homunculus

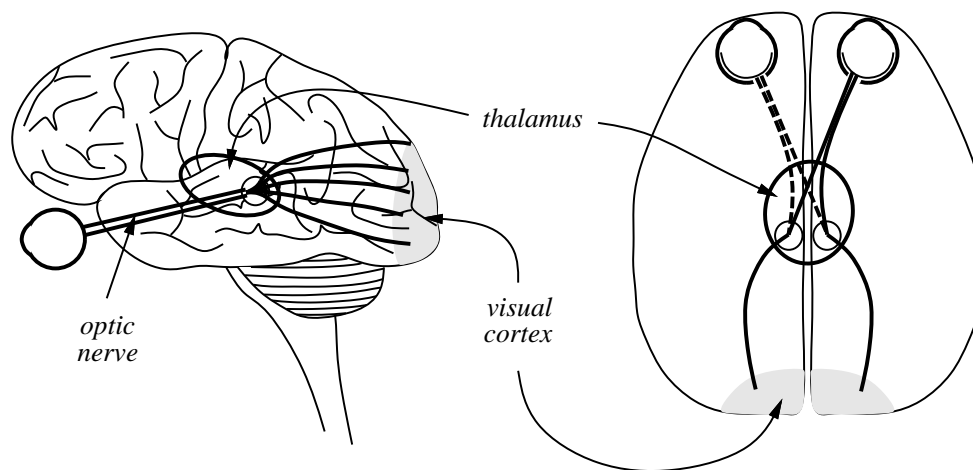


- proprioceptive feedback
- feature focus
- somatotopic organization



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The Visual Cortex

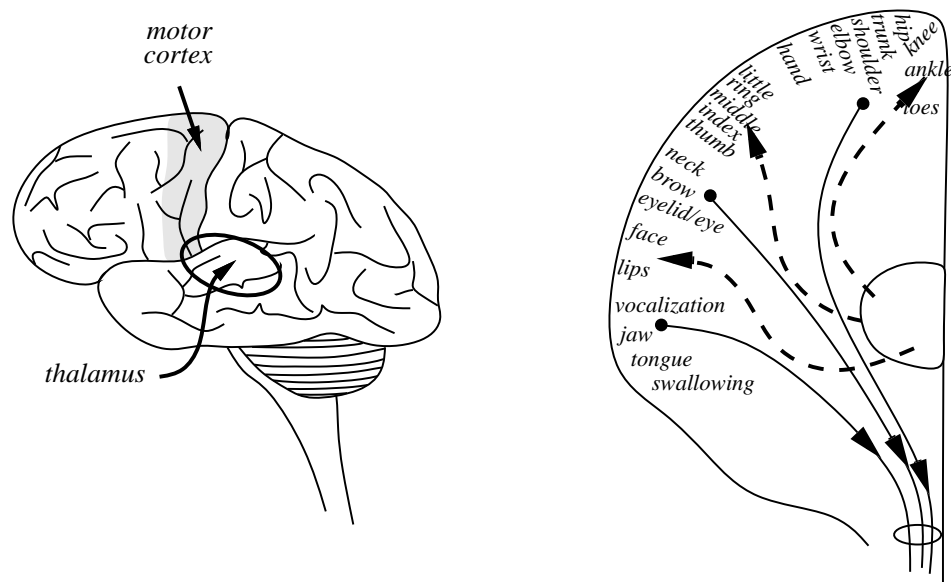


- distributed processing
- up to 60 different somatotopic maps of visual information
- low-, intermediate-, and high-level sensorimotor relationships
- low-, intermediate- and high-level feature focus



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The Motor Cortex

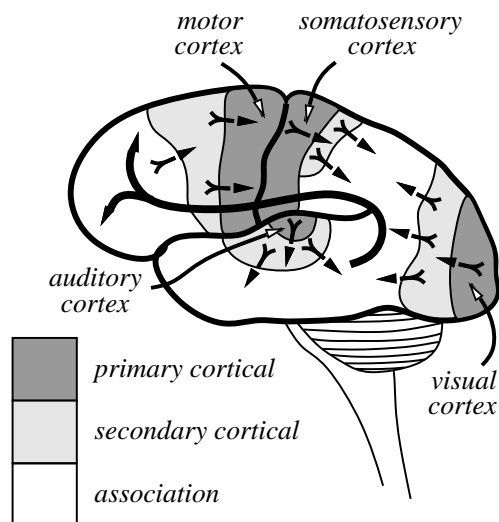


- mirrors somatotopic organization of somatosensory cortex
- cognitive and sensory *bias* to lower level motor systems
- a high level of a hierarchical motor organization ranging from reflex arcs to complex sequences of motor activity



The Neuroscience of Behavior

Sensorimotor Projections in the Brain



- strategically focuses and compresses sensory information
- context of activity includes world, organism, and task
- *fan-out* of motor strategies into large scale synergies within the musculoskeletal system



Coordinated Limb Control Bizzi, Mussa-Ivaldi and Giszter

- Model for computations underlying the execution of movement
- Translates motor plan into motor control commands
- Coarse map of limb postures in premotor area of spinal cord
- Neurally specified equilibrium point provides basis for movement
- Force fields elicited by microstimulation in frog
- Postulates vectorial combination of outputs capable of generating large number of motor behaviors