

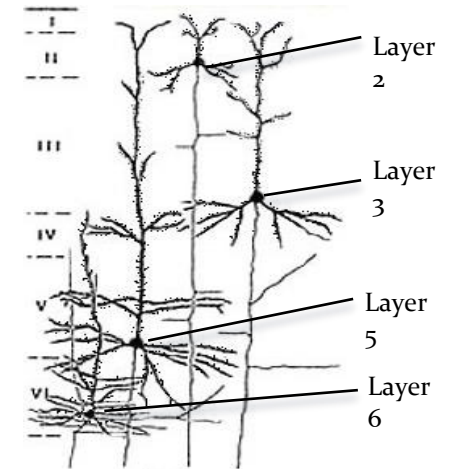
Model of mind-brain interaction - 1

Debate on mind-brain interaction with Kenneth Arnette, PhD on Seeking-I.com, April 20, 2022

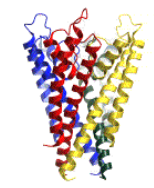
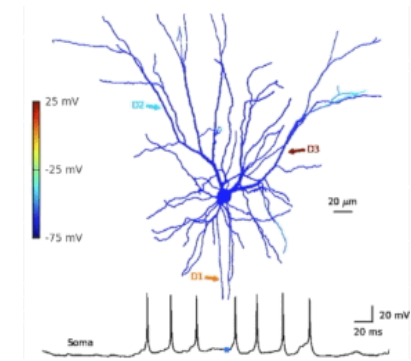
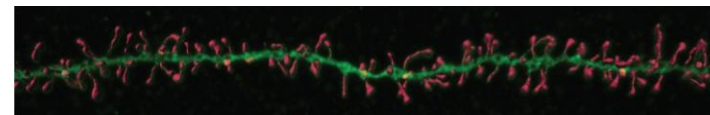
- **NDE veridical perceptions: accurate from a position outside the body and later verified**
 - All faculties of cognition occur in the mind, *not* in the brain
 - Mind acts as a cohesive unit: *continuity of consciousness* throughout the separation and return
 - → Mind is a separate entity from the brain (our mind entity hypothesis)
- **NDE evidence of interaction with physical processes**
 - Especially with solid matter and with the neural processes of in-body people
 - → Nonmaterial mind entity can interact with neurons to *sense* and to *trigger* action potentials
- **For *in-body consciousness*, the mind must work *through* the brain**
 - High correlation of subjective experience with neural electrical activity
 - → Mind must *sense* neural activity from primary visual, auditory, and tactile areas of the brain
 - → Mind must *trigger* neural activity for endogenous mental processes and for movement
- **Libet: 300-500 ms of electrical activity is needed before a stimulus can come to awareness**
 - Stimulus requires sufficient intensity and duration, otherwise sensation remains “subliminal”
 - → *All* awareness must come from sufficient neural electrical activity
 - Problem: How does the mind’s own content come to awareness??
 - Hypothesis: the mind triggers brain activity in specific regions and in specific patterns to “mirror” internal mental content and bring it to subjective awareness – a “filtering” process by the brain

Model of mind-brain interaction - 2

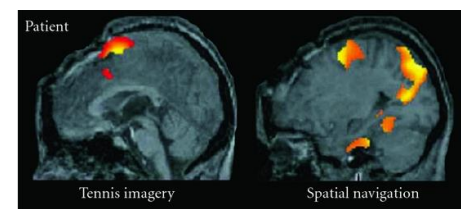
- The physical interface occurs in the cortical gray matter
 - Specifically in the apical & basal dendrites in the outermost 2-3 mm of the cortex
 - Mechanism: (1) mind “senses” neural action potentials thru back propagation
 - (2) mind opens ion channels in *dendritic spines* to “trigger” action potentials
- Evidence
 - Dendritic spines are *much denser* in regions involved in executive mental functions (PFC/DMN – 7x) and in perceptual cognition (temporal – 6x) compared to primary visual areas (V1, V2)
 - Unique neural patterns: e.g., used to communicate with patients with disorders of consciousness (yes = tennis imagery, no = spatial navigation)
 - Possible evidence of neural plasticity in recovery after brain injury, strokes, tumors



Apical dendrites in layers 2-3 and 5 pyramidal cells



Neural ion channel



Action potentials propagate back through the dendritic arbor

• Elston, G. N., Benavides-Piccione, R., & DeFelipe, J. (2001). The pyramidal cell in cognition: a comparative study in human and monkey. *Journal of neuroscience*, 21(17), RC163-RC163.

• Smith, S. L., Smith, I. T., Branco, T., & Häusser, M. (2013). Dendritic spikes enhance stimulus selectivity in cortical neurons in vivo. *Nature*, 503:115-120.

Philosophical objections to the mind entity theory

- Addressing philosophical objections to interactionist dualism
 - There is strong evidence that the *out-of-body mind interacts with physical processes*
 - There is evidence that a subtle, previously unrecognized *two-way force* is involved in mind-matter interactions
- Three specific philosophical challenges to interactionist dualism
 - Taking the mind to be a “thing” is a *category error* (Ryle, 1949)
 - The nonmaterial mind is actually in the *same category* as physical objects because the mind is an objectively real thing that unites with the brain and body
 - The *causal pairing problem* (Kim, 2011)
 - The nonmaterial mind is a three-dimensional object in physical space
 - The mind and brain are located in intimate spatial relation to one another and exert direct causal interactions with each other
 - The *causal closure of the physical* (Kim, 2011)
 - The mind is nonmaterial, yet *interacts* with physical processes and thus takes part in *physical causation*
 - The mind interfaces with the brain at *specific points of contact* at the surface of the cortex

- Kim, J. (2011). *Philosophy of mind* (3rd ed.). Westview Press.
- Ryle, G. (1949/2009). *The concept of mind*. Routledge.