Vicarious body maps bridge vision and touch in the human brain. Hedger N, Naselaris T, Kay K, Knapen T. 2026 February. Nature. 650(8100):173-181.

Re-interpretation based on the IPL mechanism

This study demonstrates vicarious body maps that bridge vision & touch explains the fundamental organizational principle of the brain: perceptual integration is achieved through shared representational resources rather than exhaustive, pairwise associations. If every visual–somatosensory correspondence required dedicated synaptic rewiring, the combinatorial explosion of possible body-part, visual-field, and contextual associations would rapidly exhaust available synaptic resources and compromise system scalability. Instead, the observed alignment of visual and somatotopic maps indicates that the brain favors reuse of existing representational structures, allowing multiple perceptual and social contexts to access a common body-referenced framework. This strategy mirrors a broader principle evident across cortical systems namely, that biological efficiency and flexibility are achieved through sharing and recombination of neural substrates rather than continuous structural rewiring.

Within this context, the semblance hypothesis offers a mechanistic account that differs fundamentally from synaptic plasticity–based explanations. The semblance hypothesis proposes that learning induces inter-postsynaptic functional LINKs (IPLs) between dendritic spines belonging to different neurons, allowing multisensory inputs to converge onto shared islets of inter-LINKed spines (IILSPs). These inter-neuronal spine hubs can be dynamically recruited across contexts, supporting vicarious touch and embodied perception without necessitating new synaptic connections for each association. This framework predicts that disruption of inter-spine coupling should selectively impair visual–somatosensory integration while sparing unimodal processing, and that longitudinal imaging should reveal stable cross-neuronal spine networks underlying shared body maps. By emphasizing resource sharing, the IILSP model provides a parsimonious, scalable substrate for the embodied, cross-modal representations reported in this study.