Constraints implicitly used in the book *Semblance of activity at the shared postsynapses and extracellular matrices*

Functional constraints 1. Memory retrieval must occur within physiological timescales. 2. Retrieval must recreate the learned event. 3. Retrieval must occur without activating the original presynaptic neuron in the path of the item whose memory is being retrieved. 4. Learning requires coincidence of at least two inputs (co-activation of at least one pair of synapses). 5. Memory must remain highly specific**.**

Cellular constraints. 1. The elementary mechanism must occur at postsynaptic sites. 2. Rapid recall cannot require protein synthesis. 3. Repeated learning should stabilize cellular changes. 4. Cellular events should be reversible and reusable.

Structural constraints. 1. Existing anatomical structures should support the mechanism. 2. Closely apposed postsynaptic membranes are required. 3. Learning should reorganize postsynaptic relationships. 4. Structural organization must permit enormous combinatorial capacity.

Physiological constraints. 1. Single-trial learning should be possible**.** 2. Forgetting should occur naturally**.** 3. Temporary ECM changes and longer-lasting structural changes should be able to explain working memory and long-term memory**.**

Systems-Level constraints. 1. No separate mechanism should be required for systems memory. 2. Consolidation (Cortical mechanism survive hippocampal loss after sufficient learning) must be explained. 3. Reconsolidation (temporary lability of memory upon reactivation) must be explained**.** 4. The mechanism must accommodate ongoing adult neurogenesis.

Plasticity Constraints. 1. The mechanism must remain compatible with LTP**.** 2. Protein synthesis dependence for long-term stabilization must be explained**.** 3. Related learning should become easier**.**

Network constraints. 1. Memory codes must be distributed (Memory should depend on many postsynaptic relationships rather than single neurons). 2. Retrieval should tolerate partial cues**.** 3. Degeneracy should exist (Different but related cues should retrieve the same memory). 4. The mechanism should explain other brain functions such as perception.