

Agenda

I. Principles of Encoding

II. MTL and Declarative Memory

- Conscious/Explicit Memory?
- Functional Distinctions within MTL?
- MTL and Consolidation?

Principles of Episodic Encoding

Distribution of Practice

Understanding Distributed Practice

Stimulus Sampling Theory & Lag Effects

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PFC, MTL, and Episodic Encoding

Hippocampus & Memory Formation

Hippocampus & Recollection

What is the nature of MTL-mediated memory?

- trace conditioning
 - may depend on MTL because acquisition of the CS–US association may require knowledge of the relationship to build and to be consciously remembered across many trials

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MTL Memory System

MTL Circuitry

MTL Lesions and Amnesia

H.M. and New Semantic Learning

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Hippocampal Lesion & Semantic Learning?

(Vargha-Khadem et al., 1997)

- 3 patients with early, selective hippocampal insult

- anterograde amnesia for everyday, episodic events
- relative sparing of semantic learning abilities
 - fared okay in mainstream education
 - competent in speech & language
 - learned to read, write, & spell at levels commensurate with Verbal IQ
 - in normal range on vocabulary, information, & comprehension subtests of the VIQ scale
 - ability to comprehend and express ideas through language
 - thus, acquired requisite symbolic, semantic knowledge
- relatively intact recognition
 - including associative recognition within domain (e.g., word-word, face-face)
 - impaired associative recognition across domains (e.g., voice-face, object-place)
 - intact familiarity-based item recognition, but impaired recollection

Functional Segregation within MTL?

Multiple MTL learning circuits

(Aggleton & Brown, 1999)

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Retrograde Amnesia – Consolidation

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Modal Theory: MTL & Consolidation

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Flat Temporal Gradient in RA?

Memory for Episodic Details

Tests of declarative knowledge tend to be insensitive to level of episodic retrieval (Nadel et al., 2000)

- 1–3 pt scoring based on retrieval of
 - 3 = time and place, and some details of event
 - 2 = less detail or time/place not specified
 - 1 = only general info is provided

- subjective & doesn't discriminate between very rich episodic detail and those details that are just enough to warrant a full score

- new scoring technique: just count the number of details provided

Retrograde Amnesia:

No Gradient for Episodic Details

Multiple Memory Trace (MMT) Theory

Traditional theory (Squire, 1992; McClelland et al., 1995)

- MTL provides a mechanism for linking together physically separated neocortical fragments (e.g., different types of event content)

- episodic and semantic memory have equivalent neural underpinnings, and thus should have similar temporal gradients (not always so)

- stabilization of neocortical representations over time render MTL contributions unnecessary

MMT theory (Nadel & Moscovitch, 1997)

- MTL is *always* involved in storage and retrieval of episodic memories, independent of age

- each episodic event is represented by a MTL memory trace, and traces replicate over time

- long-term interactions between MTL and neocortex stabilize semantic memories over time (consolidation for semantic memory)

MTT: MTL & Episodic Memory