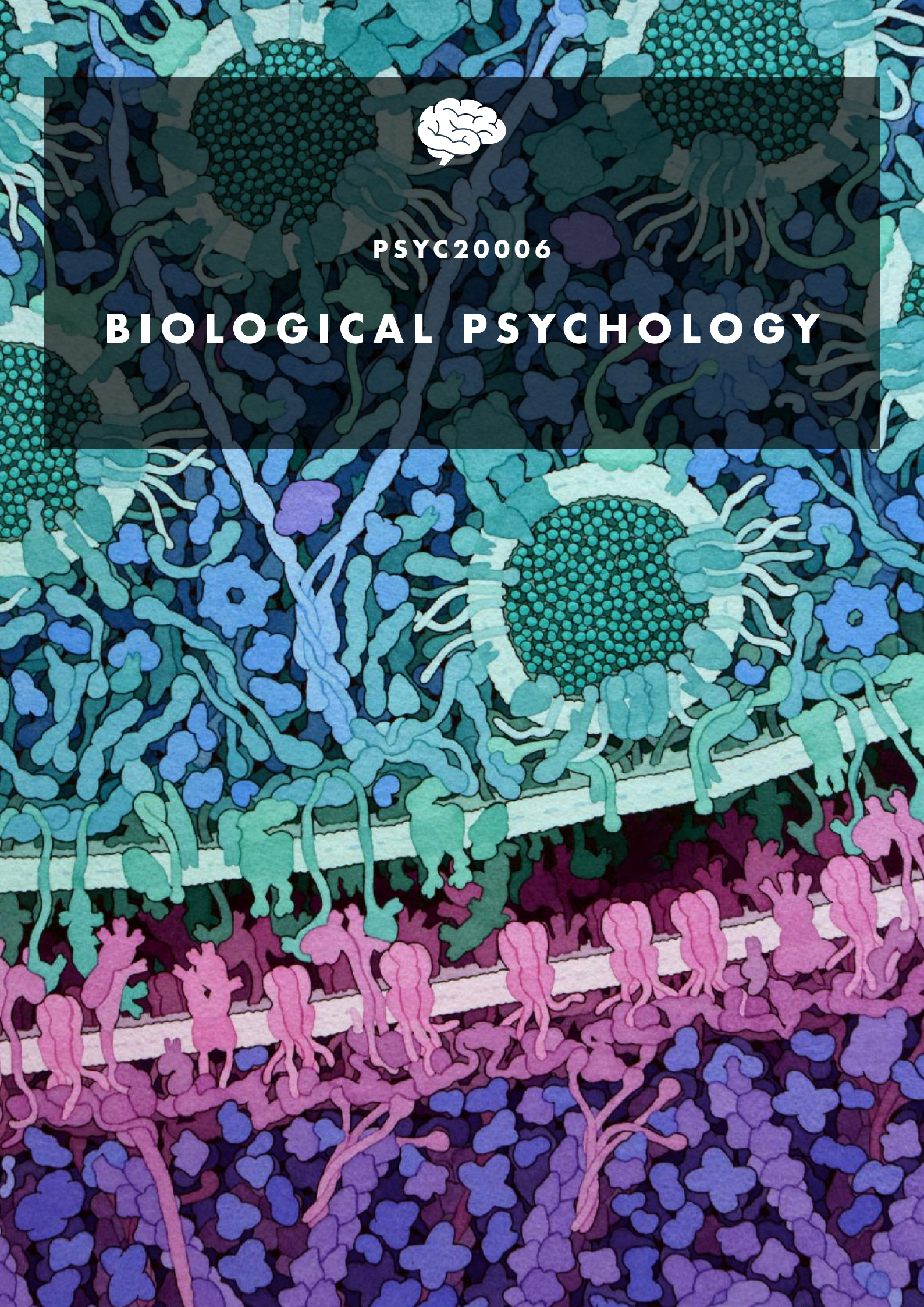




PSYC20006

BIOLOGICAL PSYCHOLOGY





COGNITIVE THEORIES OF MEMORY

Procedural Memory: The storage of skills & procedures, key in motor performance. It involves memory systems that are independent of the hippocampal formation, in particular, the cerebellum, basal ganglia, cortical motor sites. Doesn't involve mesial-temporal function, basal forebrain or diencephalon.

Declarative memory: Accumulation of facts/data from learning experiences.

- Associated with encoding & maintaining information, which comes from higher systems in the brain that have processed the information
- Information is then passed to hippocampal formation, which does the encoding for elaboration & retention.

Hippocampus is in charge of structuring our memories in a relational way so everything relating to the same topic is organized within the same network. This is also how memories are retrieved. Activation of 1 piece of information will link up the whole network of related pieces of information. Memories are placed into an already existing framework, and so memory activation can be independent of the environment.

MODELS OF MEMORY

Serial models of Memory include the Atkinson-Shiffrin Model, Levels of Processing Model & Tulving's Model — all suggest that memory is processed in a sequential way. A parallel model of memory, the Parallel Distributed Processing Model, is one which suggests types of memories are processed independently.

Atkinson-Shiffrin Model

First starts as **Sensory Memory** (visual / auditory). If nothing is done with it, fades very quickly but if you pay attention to it, it will move into working memory.

Working Memory contains both new information & from long-term memory. If it goes through an encoding process, it will be in long-term memory. Otherwise, will also be forgotten.

Long-term Memory is a more stable memory system, where structural neural changes occur to make stable memories. However, this is not the true version of reality, but only the individual's perception of reality, which may be affected by interpretations, perception, emotions, etc. Over time, rehearsal will happen repeatedly over time & the memory will be altered slightly every time, because of our specific schema at the time.

Levels of Processing Model (Craig and Lockhart)

Long-term memory is retained depending on the degree of processing that is undergone to process the information. Processing is a continuum of shallow → deep. It also depends on the type of

rehearsal you do: **Maintenance:** constant repetition results in more shallow memory
Elaborative: Relating information to semantic framework results in deeper information encoding because it takes more effort to do so.

Tulving's Model

Interested in the different types of long-term memory, with procedural memory, and declarative memory being split up into episodic (recall of an event) & semantic memory (recall of facts). His model & findings were supported by lesions studies.

Parallel Distributed Processing Model

Memory is the activation of connections in different areas simultaneously (in parallel). Difference in strength between nodes represent the memory/knowledge itself, where 1 memory will have a unique pattern of activation.

Note: no models fully account for all research, but serial models (esp. Tulving's) most useful for amnesic state

EPISODIC MEMORY

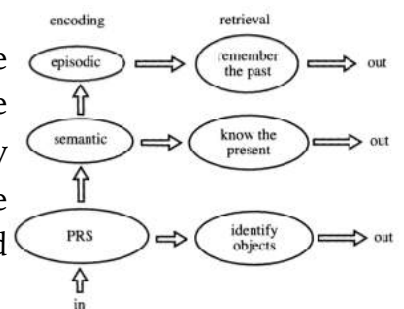
Allows an individual to re-experience previous experiences through autonoetic awareness & project similar experiences into the future. Autonoetic awareness is the autobiographical consciousness / recollection of one's personal past. This form of memory is more recently evolved than other memory systems & develops later in life. Episodic memory relies heavily on semantic memory — it shares the same neural mechanism & cognitive processes, but also has its own unique features.

SEMANTIC MEMORY

'Knowledge Memory' — Ability to acquire & retain factual information. No autonoetic awareness of personal past once embedded in the semantic memory system.

- **Squire & Zola:** suggested episodic & semantic are entirely parallel within declarative memory. They are part of the exact same system depending on the hippocampal system. Damage to hippocampal system results in equal damage to both types of memories (e.g. HM)

- **Tulving (Serial Parallel Independent Hypothesis):** When we separate the way the memory is acquired & retrieved, pathways are not actually the same. Both memory types rely on the same memory system for encoding, though episodic memory has unique components. In retrieval, both memory types are retrieved independently!



∴ Predicts single dissociation for encoding & double dissociation for retrieval

Note: no dissociation = damage X, affect A & B

single dissociation = damage X, affect A not B — damage Y, affect A & B

double dissociation = damage X, affect A only — damage Y, affect B only

Vargha-Khadem study

Involved 3 patients with early bilateral medial temporal lobe injury. All had abnormally small bilateral hippocampi — very damaged hippocampal formation & significant memory impairment (episodic memory tests).

Results: Despite needing full-time care, all 3 actually had factual knowledge in the normal range (semantic memory intact).

2 systems are functionally dissociable since semantic memory is still intact. This fits in with Tulving's SPI Model since semantic memory does not rely on episodic memory. BUT, semantic dementia has shown that some are still able to learn information regarding their episodic memory to a higher level than their semantic memory. Despite this, we still know that interactions occur between these systems but the exact mechanism is not well understood yet.

TIP : Quite a few questions from this lecture in the final exam, and be careful to know the specific names of the people involved with each of these theories, as the questions in the final exam tend to be oddly specific.