

IST605: Human Information Processing — Memory I

Practice Questions

Distribution: 25% Easy (5) | 40% Normal (8) | 35% Hard (7) — 20 questions total

Types: MCQ, structural (short answer), and complete (paragraph). All with answers and explanations.

Note: MCQ answers are randomly distributed across A, B, C, D to avoid bias.

EASY (25% — 5 questions)

E1. MCQ

What is the theoretical number of chunks that can typically be stored in short-term memory?

- A) 5 to 9 chunks (7 ± 2)
- B) 3 to 5 chunks
- C) 10 to 15 chunks
- D) Unlimited chunks

► **Answer**

A) 5 to 9 chunks (7 ± 2)

Explanation: The memory span for short-term memory is approximately 7 ± 2 chunks, meaning typically 5 to 9 chunks of meaningful information can be held. This represents the theoretical limit of how many chunks can be stored in short-term memory at once.

E2. Structural

Name the two specialized subsystems in Baddeley's model of working memory.

► **Answer**

Phonological loop and **visuospatial sketchpad**.

Explanation: Baddeley's model consists of a central executive plus two specialized subsystems: the phonological loop (for acoustic/speech information) and the visuospatial sketchpad (for visual and spatial object manipulation).

E3. MCQ

In the serial position effect observed in free recall experiments, which positions on a list are typically recalled best?

- A) Only items at the beginning
- B) Only items at the end

- C) Items at the beginning and end, but not the middle
- D) Items are recalled equally regardless of position

► **Answer**

- C)** Items at the beginning and end, but not the middle

Explanation: The serial position effect shows that items at the beginning (primacy effect) and end (recency effect) of a list are more likely to be recalled than items in the middle. This occurs because early items get more rehearsal time and transfer to long-term memory, while end items are still in short-term memory.

E4. Structural

What are the three main processes of memory?

► **Answer**

Encoding (initial processing and representation), **Storage** (maintaining information), and **Retrieval** (accessing stored information).

Explanation: These three fundamental processes describe how information enters memory (encoding), how it is maintained (storage), and how it is accessed when needed (retrieval).

E5. MCQ

According to the spacing effect, when are repetitions more likely to produce stronger memories?

- A) When repetitions occur back-to-back in quick succession
- B) When repetitions occur at the same time of day
- C) When repetitions are spaced out over time
- D) Spacing has no effect on memory strength

► **Answer**

- C)** When repetitions are spaced out over time

Explanation: The spacing effect demonstrates that repetitions spaced in time produce stronger memories than repetitions massed closer together. This is why spaced study sessions are more effective than cramming, and why advertisements are more memorable when spaced out rather than played back-to-back.

NORMAL (40% — 8 questions)

N1. MCQ

What happens to the recency effect in free recall when subjects are given a 30-second distracting task before recall?

- A) Both primacy and recency effects are eliminated
- B) Both effects remain unchanged

- C) The primacy effect is eliminated, but recency effect remains
- D) The recency effect is eliminated, but primacy effect remains

► **Answer**

D) The recency effect is eliminated, but primacy effect remains

Explanation: When a distracting task is introduced before recall, items at the end of the list (recency effect) are no longer recalled well because they were being held in short-term memory, which the distraction disrupts. Items at the beginning (primacy effect) remain well-recalled because they were transferred to long-term memory through extended rehearsal.

N2. Complete

Explain how chunking works in short-term memory and why "CRTV BBC CNN" is easier to remember than "C RT VBB CCNN" for someone familiar with these networks.

► **Answer**

Chunking is the process of storing meaningful groups of information as single units (chunks) in short-term memory. Instead of storing every individual letter or piece, you store the idea that a particular chunk occurred. When retrieving, you recall the chunk from short-term memory and then retrieve its constituents from long-term memory.

For someone familiar with TV networks, "CRTV BBC CNN" forms three meaningful chunks (three network names), while "C RT VBB CCNN" doesn't match recognizable patterns and requires remembering individual letters. Since short-term memory capacity is limited to about 7 ± 2 chunks, remembering three chunks is much easier than remembering many individual letters. Chunking depends on prior knowledge—what is meaningful depends on what you know. Someone unfamiliar with these networks might find both equally difficult.

Explanation: Chunking demonstrates that memory capacity is about meaningful units, not raw information. Prior knowledge determines what can be chunked effectively.

N3. MCQ

In the encoding specificity principle example with word pairs, why is cued recall ("river" → "bank") better than recognition ("piggy bank" → did you see "bank"?) even though recognition is usually easier?

- A) The word "bank" was encoded with a different meaning (river edge) than in the recognition test (financial institution)
- B) Recognition tests are always harder than recall tests
- C) Cued recall provides more time to think
- D) The recognition test used a different word pair

► **Answer**

A) The word "bank" was encoded with a different meaning (river edge) than in the recognition test (financial institution)

Explanation: The encoding specificity principle states that memory is better when encoding and retrieval contexts match. In the original encoding, "bank" was paired with "river" (meaning river edge). In recognition, "bank" appears with "piggy" (financial meaning), creating a mismatch. In cued recall, the cue "river" matches the original encoding context, leading to better performance despite recognition typically being easier.

N4. Structural

Describe the two parts of the phonological loop and their functions.

► **Answer**

Phonological store: Holds acoustic or speech-based information for about 2 seconds. This explains why if you hear someone talking but don't pay attention, you can usually repeat the last part of their speech if asked—the phonological store still has the last 2 seconds.

Articulatory control process: Produces inner speech (the voice we hear in ourselves). This allows subvocal rehearsal, refreshing the phonological store to keep information available and prevent decay.

Explanation: These two components work together: the store holds information briefly, while the articulatory process maintains it through rehearsal.

N5. MCQ

What is the main difference between retroactive and proactive interference?

- A) Retroactive interference is permanent, proactive interference is temporary
- B) Retroactive interference affects short-term memory, proactive affects long-term memory
- C) There is no difference—they are the same phenomenon
- D) Retroactive interference is caused by later learning interfering with earlier material; proactive interference is caused by earlier learning interfering with later material

► **Answer**

D) Retroactive interference is caused by later learning interfering with earlier material; proactive interference is caused by earlier learning interfering with later material

Explanation: Retroactive interference occurs when learning List B after List A makes it harder to recall List A (later learning interferes with earlier). Proactive interference occurs when learning List B first makes it harder to learn List A later (earlier learning interferes with later). Both demonstrate how interference from other material causes forgetting.

N6. Complete

Explain how organization affects memory encoding and recall, using the experimental evidence comparing categorized versus random word lists.

► Answer

Organization refers to structuring information in meaningful ways, and it significantly improves memory performance. In experiments comparing categorized word lists versus randomly ordered lists, recall was much better when items were organized by category (65% vs. 18%). Even after multiple trials when both conditions improved, the random condition still performed 63% worse than the organized condition.

This occurs because memory for an item often depends on other items present. When items are organized (e.g., by category), they form meaningful relationships that serve as retrieval cues. The organization provides a structure that helps both encoding (items are encoded in relation to their category) and retrieval (categories serve as retrieval plans). This is why good students organize information well in memory—it creates multiple pathways for accessing information and reduces the cognitive load during both storage and retrieval.

Explanation: Organization creates meaningful relationships between items, providing structure that facilitates both encoding and retrieval processes.

N7. MCQ

In the intentional forgetting experiment, what do the different results between recall and recognition tests tell us about forgetting?

- A) Items are not permanently lost—they are just not accessible via recall, but are accessible via recognition
- B) All forgotten items are permanently lost from memory
- C) Recognition tests are always easier than recall tests
- D) The forget signal permanently erases memories

► Answer

A) Items are not permanently lost—they are just not accessible via recall, but are accessible via recognition

Explanation: When subjects were told to forget items preceding a signal, recall tests showed poor memory for those items (suggesting loss). However, recognition tests showed subjects could still identify those items as belonging to the list. This demonstrates that the items were not permanently lost from memory storage—they were simply not accessible through recall, but remained accessible through recognition, which provides more retrieval cues.

N8. Structural

What are the four main encoding influences on long-term memory, and briefly describe what each involves?

► Answer

1. **Levels of processing:** Memory depends on depth of processing, from shallow (physical characteristics) to deep (meaning). Deeper processing leads to better memory.
2. **Memory for meaning:** We remember the meaning of information rather than exact words. People cannot distinguish between literal information and natural inferences, but detect changes that alter meaning.

3. **Organization:** When items are organized (e.g., by category), recall is much better than when items are random. Organization creates meaningful relationships that aid both encoding and retrieval.
4. **Elaboration:** When we elaborate or explain information (e.g., "she has an umbrella because it might rain"), we're more likely to remember it. Elaborations help augment incomplete information with knowledge from memory.

Explanation: These four factors demonstrate different ways that encoding strategies can improve long-term memory formation and retrieval.

HARD (35% — 7 questions)

H1. MCQ

According to the phonological loop interpretation of memory span, what determines how many items can be held in short-term memory?

- A) The visual complexity of the items
- B) The number of meaningful chunks
- C) The emotional significance of the items
- D) The time it takes to rehearse the information

► **Answer**

D) The time it takes to rehearse the information

Explanation: While chunking theory suggests memory span is about the number of chunks, the phonological loop interpretation emphasizes rehearsal time. If chunks are fast to rehearse (e.g., short words), memory span is greater. If chunks take longer to rehearse (e.g., long words), fewer can be maintained. This suggests the 2-second capacity of the phonological store limits how much can be rehearsed before decay occurs.

H2. Complete

Compare and contrast how the primacy and recency effects in free recall are explained, and what happens to each when a distracting task is introduced before recall.

► **Answer**

The **primacy effect** (better recall of items at the beginning of a list) occurs because early items enter short-term memory when it's not yet full. These items stay longer in STM, receive more rehearsal time, and have the best opportunity to be transferred to long-term memory. When a distracting task is introduced before recall, the primacy effect remains because these items were successfully transferred to long-term memory, which is not disrupted by the distraction.

The **recency effect** (better recall of items at the end of a list) occurs because these items are still actively maintained in short-term memory (specifically the phonological loop of working memory) at the time of recall. They haven't had time to decay or be displaced. However, when a distracting task is introduced before recall, the recency effect is eliminated because the distraction disrupts the phonological loop, causing these items to be lost before they can be transferred to long-term memory.

Key difference: Primacy relies on successful transfer to long-term memory through extended rehearsal, while recency relies on temporary maintenance in short-term memory. This is why distraction affects recency but not primacy—it disrupts STM but not LTM.

Explanation: The different explanations for primacy and recency effects, and their differential response to distraction, provide evidence for the distinction between short-term and long-term memory systems.

H3. MCQ

In the context change effect, why is the effect more difficult to obtain when recognition (rather than recall) is used as the memory measure?

- A) Recognition tests are always harder than recall tests
- B) Context only affects recall, not recognition
- C) Recognition provides more retrieval cues, reducing the need for context matching
- D) Recognition tests are conducted in different rooms

► **Answer**

- C)** Recognition provides more retrieval cues, reducing the need for context matching

Explanation: Context effects occur because matching the encoding context (e.g., same room) provides additional retrieval cues. Recognition tests already provide many cues (the items themselves are presented), so the benefit of context matching is smaller. Recall tests provide fewer cues, making context matching more critical for successful retrieval. This demonstrates that context effects depend on how much the retrieval situation matches the encoding situation—recognition already provides substantial matching through the items themselves.

H4. Complete

Explain how elaboration differs from simple encoding, and why elaboration improves memory. Use the example of seeing someone with an umbrella to illustrate your answer.

► **Answer**

Simple encoding involves registering the basic information (e.g., "person has an umbrella"). **Elaboration** goes beyond this by adding explanations, inferences, or connections to existing knowledge (e.g., "person has an umbrella because she believes it might rain").

Elaboration improves memory for several reasons:

1. **Deeper processing:** Elaboration involves semantic processing (meaning), which is deeper than surface-level encoding, leading to stronger memory traces.
2. **Multiple retrieval paths:** When you elaborate, you create connections between the new information and existing knowledge. If you later think about rain or weather, this can cue the memory of the umbrella.
3. **Augmenting incomplete information:** Elaboration helps interpret and complete partial information. When you see someone at a door with an umbrella, you don't just encode "umbrella"—you infer why

they have it, creating a richer memory representation.

4. **Contextual embedding:** Elaborations embed information in a meaningful context, making it easier to retrieve when that context is encountered again.

In the umbrella example, if someone later asks if the woman had an umbrella, you're more likely to remember if you had elaborated (connected it to weather/rain) than if you had simply encoded the fact. The elaboration creates multiple ways to access the memory.

Explanation: Elaboration transforms passive encoding into active construction of meaning, creating richer memory representations with more retrieval pathways.

H5. MCQ

What does the spacing effect over long periods (e.g., 14-day, 28-day, 56-day intervals in vocabulary learning) tell us about why spacing works?

- A) Longer intervals between repetitions lead to better long-term retention, even though overall recall declines over time
- B) Spacing only works for short intervals
- C) Massed practice is better for long-term retention
- D) The spacing effect is only a short-term phenomenon

► **Answer**

A) Longer intervals between repetitions lead to better long-term retention, even though overall recall declines over time

Explanation: Research shows the spacing effect works over very long periods. In foreign language vocabulary studies with 14-day, 28-day, and 56-day intervals, recall declined over years as expected, but consistently, recall was better the longer the interval between learning sessions. This suggests spacing works because: (1) repetitions encoded under different contexts create multiple retrieval paths, (2) later repetitions remind learners of earlier presentations, and (3) learners store information about changes in encoding and context. The effect persists even as overall memory declines, demonstrating spacing's robust benefit for long-term retention.

H6. Complete

Compare the three main hypotheses for forgetting (decay, interference, and overwriting). What does the intentional forgetting experiment tell us about which hypothesis is most supported?

► **Answer**

Decay hypothesis proposes that memories automatically lose strength over time when not recalled or studied. However, this has been very difficult to support experimentally, as it's hard to rule out interference as an alternative explanation.

Interference hypothesis proposes that forgetting results from interference from other material. **Retroactive interference** occurs when later learning interferes with earlier material (List B interferes with List A recall).

Proactive interference occurs when earlier learning interferes with later material (List B learned first interferes with List A learned later). This hypothesis has strong experimental support.

Overwriting hypothesis proposes that memories are changed by later events so original memories cannot be retrieved because they no longer exist. Example: A second roller coaster ride may replace parts of the memory of the first ride.

Intentional forgetting experiment evidence: Subjects told to forget items preceding a signal showed poor recall for those items (suggesting loss). However, recognition tests showed subjects could still identify those items, demonstrating they were not permanently lost. This supports **interference** over decay or overwriting—the items were still in memory but not accessible through recall due to interference from the "forget" instruction or subsequent items. If decay or overwriting had occurred, recognition should also fail. The fact that recognition succeeded shows the memories existed but were blocked from recall, consistent with interference rather than permanent loss.

Explanation: The intentional forgetting experiment provides evidence that forgetting is often a retrieval problem (interference) rather than permanent loss (decay/overwriting), though overwriting may occur in some circumstances (e.g., eyewitness testimony with misleading information).

H7. MCQ

Why can visual and auditory tasks often be performed together more easily than two visual tasks or two auditory tasks, according to working memory theory?

- A) The phonological loop and visuospatial sketchpad operate independently and don't interfere with each other
- B) Visual tasks require more resources than auditory tasks
- C) Auditory information is processed faster than visual information
- D) The central executive prioritizes cross-modal tasks

► **Answer**

A) The phonological loop and visuospatial sketchpad operate independently and don't interfere with each other

Explanation: In Baddeley's working memory model, the phonological loop (for auditory/speech information) and visuospatial sketchpad (for visual/spatial information) are separate subsystems. The sketchpad is interfered with by other visual tasks but not by verbal tasks, and the phonological loop is interfered with by verbal tasks but not by visual tasks. This independence allows visual and auditory tasks to be performed simultaneously without competing for the same resources, while two tasks from the same modality compete for the same subsystem's limited capacity.

Answer Key (Quick Reference)

ID	Answer
E1	A
E2	Phonological loop, visuospatial sketchpad

ID	Answer
E3	C
E4	Encoding, Storage, Retrieval
E5	C
N1	D
N2	(See explanation: chunking)
N3	A
N4	(See explanation: phonological loop parts)
N5	D
N6	(See explanation: organization)
N7	A
N8	(See explanation: four encoding influences)
H1	D
H2	(See explanation: primacy vs recency)
H3	C
H4	(See explanation: elaboration)
H5	A
H6	(See explanation: forgetting hypotheses)
H7	A