

Homework #1

Psy 20 Cognitive Psychology
Prof. Colin Camerer
Spr 2002

Work alone. Spend no more than two hours on this homework. Do not consult any text, written notes, or fellow students between the time that you begin the homework and the time you hand it in. The homework is due Monday Apr 22 at 11 am (in class or in my mailbox or to Karen Kerbs in Baxter 332). Late homework without prior arrangements will be reduced in grade by 50% for each late day.

These are worth 5 points each. Give one answer.

1. Research in artificial intelligence has:
 - A) failed to produce any useful models of human intelligence.
 - B) had notable successes, but still cannot match the power of human intelligence.
 - C) developed models of mind that duplicate the most intricate of human thought processes.
 - D) duplicated all but the most abstract processes of human intelligence.

2. A synaptic connection that decreases potential difference in the neuron is called _____ while a synaptic connection that increases potential difference is called _____.
 - A) a postsynaptic charge; a presynaptic charge
 - B) inhibitory; excitatory
 - C) membrane depolarization; membrane hyperpolarization
 - D) excitatory; inhibitory

3. The tendency to organize elements that are close together into units is referred to as the principle of:
 - A) closure.
 - B) contiguity.
 - C) proximity.
 - D) continuation.

4. Which Gestalt principle accounts for our tendency to segregate stars into constellations?
 - A) the principle of closure
 - B) the principle of proximity
 - C) the principle of whole-part segregation
 - D) the principle of similarity

5. The notion of template matching in pattern recognition can be likened to:
 - A) having stored mental blueprints to compare external objects against.
 - B) using an internal best exemplar model to compare external objects against.
 - C) checking specific features of the external object against an internal checklist of crucial features.

D) accessing neural cell assemblies that physically resemble the external object.

6. Support for Biederman's theory of object recognition comes from a study in which either components or segments were dropped from objects. The results showed that:

A) subjects could recognize figures more accurately with components missing than with segments missing without regard to the length of exposure.

B) segment deletion was most crucial to recognition.

C) at brief exposures, subjects were more accurate in recognizing figures with components dropped than with segments missing.

D) subjects were more accurate with component deletion only under the long exposure condition.

7. In Treisman's attenuation theory of attention, the notion is that:

A) messages may be attenuated based on physical properties, but semantic selection criteria apply to all messages.

B) weak semantic content attenuates the strength of a message thus leading to it being filtered out.

C) weak physical traits attenuate semantic evaluation resulting in the message being filtered out.

D) messages may be attenuated based on semantic traits but physical selection criteria apply to all messages.

8. In her feature-integration theory, Treisman proposed that people:

A) must segment objects into elements before they shift attention.

B) must focus attention on a stimulus before they can synthesize the pattern.

C) use many contextual cues and top-down processing in order to extract salient features.

D) use mostly physical cues of the stimulus to guide feature extraction for later integration.

9. Some evidence for object centered attention involves the phenomenon of:

A) attenuation.

B) partial report.

C) inhibition of return.

D) neglect of visual field.

10. You can probably carry on a conversation and drive a car at the same time because driving the car:

A) has become an automatic process requiring little direct attention.

B) is largely based on conditioned responses that are controlled in the lower brain centers.

C) is different enough from conversing that the two do not interfere with each other.

D) is almost entirely a bottom-up skill.

11. Santa presented an array of three geometric objects and then tested subjects with either the same configuration or a linear rearrangement of the objects. The results showed that:

A) subjects were faster when the test array preserved the original spatial information.

B) subjects were faster when the test array was presented in linear form.

C) there was no difference between the spatial and the linear presentations.

D) subjects were more accurate in the linear configuration but faster in the spatial configuration.

12. Homunculus cognition is recognized as a:

A) significant advance in understanding human cognition.

B) strong theoretical position because it can be actualized in very powerful mathematical models.

C) failure of scientific explanation because it replaces one mystery with another.

D) weak but necessary step toward better understanding of human cognitive processing.

13. Mental-rotation research suggests that:

A) it is harder to rotate an object in depth than in the picture plane.

B) we have neural diagrams actually rotating in our head.

C) people prefer to rotate objects in a clockwise direction.

D) subjects imagine an object moving in continuous stages as they mentally rotate it.

14. Studies of complex mental images (such as Reed's work) suggest that:

A) visual images have a hierarchical organization.

B) spatial structure is processed in the temporal lobe and visual detail in the sensory cortex.

C) the detail of the image must be segmented into many subcomponents before meaning can be attached.

D) a gestalt quality resists fragmentation and preserves the integrity of the image's structure.

15. The behaviorists criticized introspectionism because:

A) one could not systematically study language.

B) it was impossible to describe certain mental structures in words.

C) the results could not be replicated from one lab to the next.

D) subjects could not provide introspective reports of the subconscious.

II: The following questions are worth 10 points each (write only in space below the question)

1. Describe the "pop out" effect in attention research? How can it be measured statistically?

2. Describe two typical biases- i.e., discrepancies between objective maps and internal mental perceptions-- in perceptions of geography.

3. How do frequent "febrile epileptic episodes" in children (temporary epileptic fits due to high fever which do not persist as the children get older) help explain "eidetic imagery"?

4. Autistic children lack "theory of mind" but exhibit unusual skill (relative to normal subjects) in other domains of physical judgment.

(a) Explain a typical result showing "theory of mind deficit"

(b) Explain one finding showing how autistics are actually better than normal subjects in judgment or perception.