

Multimodal Perception and Cognition

Re-examination

Medialogy 7th Semester, Aalborg University (Aalborg and Esbjerg)

Monday 19 March 2012, 09.00 - 12.00

Instructions and information

- There are 10 questions and you should attempt to answer all of them.
- You are not allowed to bring any written material or electronic devices into the examination room.
- You have 3 hours to complete the examination.
- The maximum number of marks for each question is 10. You must get at least 50 marks in total to pass the examination.
- You are advised to spend about 15 minutes on each question.

DO NOT TURN OVER UNTIL TOLD TO DO SO!

Questions

1

Chalmers proposed that the problems of consciousness can be divided into the “easy” problems and the truly “hard problem”. What did Chalmers consider to be the “hard problem”? Give examples of the type of problem that Chalmers considered to be “easy”.

2

Define and explain Biederman’s *non-accidental principle* and give an example of where it breaks down.

3

Explain what is meant by *echoic memory*. How can an experiment based on dichotic listening be used to demonstrate the existence of echoic memory?

4

Suppose we listen to an X-pattern consisting of two interleaved, crossing, isochronous tone sequences, one ascending and one descending. Suppose the ascending sequence has a noticeably different timbre from that of the descending sequence. Suppose that pattern *A* contains only the ascending sequence in the X-pattern and that pattern *B* contains only the upper tones in the X-pattern (i.e., the first half of the descending line followed by the second half of the ascending line). Which of the two patterns, *A* or *B*, will be easier to perceive when listening to the full X-pattern? If the X-pattern were modified so that all the tones had the same timbre, how would this affect the relative ease with which the listener could hear a crossing percept as opposed to a bouncing percept?

5

Explain the difference between a periodic and a non-periodic sound wave. Give examples of each of these types of sound wave. Which of the two types of wave is typically heard to have a pitch?

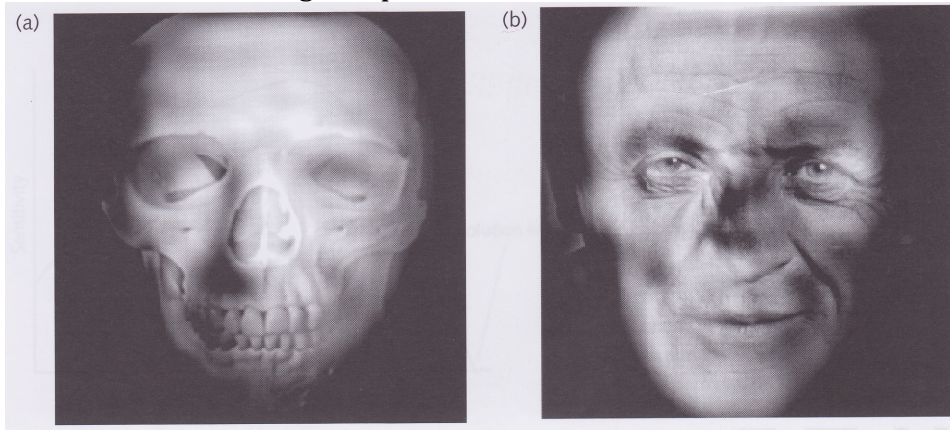
6

Sherrington and Helmholtz both proposed theories of how the brain tracks eye movements. Which of the two theories proposes that the brain compares retinal image motion with eye muscle movements? What does the other theory propose that retinal image motion is compared with? Experiments have shown that movement is still perceived when the eyeball is prevented from moving. Which of the two theories does this result contradict?

EXAMINATION CONTINUED ON NEXT PAGE

7

Consider the following two pictures:



Both pictures were created by superimposing a picture of Anthony Hopkins and a picture of a skull. However, when viewed close up, picture (a) is generally perceived to look more like a skull while picture (b) is generally perceived to look more like Anthony Hopkins. When viewed from far away, the reverse is true. Explain why this is so.

8

Explain what is meant by the term *cortical magnification factor*. The fovea covers about $1/20000$ of the visual field. However, about $1/10$ of the cells in V1 code for information sent from the fovea. What is the cortical magnification factor of the fovea?

9

(a) Explain how a single circular ON-centre receptive field can act as an edge detector. (b) Can such a receptive field give information about the orientation of an edge? (c) Explain your answer to part (b).

10

In cognitive neuropsychology, explain what is meant by the *assumption of subtractivity*. Explain how brain plasticity can cause this assumption to be invalid.

END OF EXAMINATION