

Examen PSY2300, h 2018 questions

English version

Only three (3) of the following four (4) questions have to be answered. Keep the answers brief! The answers can be given in English, Norwegian, Swedish, or Danish.

Question 1 – Perception: (a) What is a visual illusion? What can we learn from illusions about perception; (b) Explain the “Inverse-problem” of perception. Why does it exist? (c) What is Multisensory Integration? Describe an empirical phenomenon that demonstrates it. How do the “modality appropriate hypothesis” and the “maximum likelihood model” explain the phenomena?

Question 2 – Working memory: (a) What is the “phonological loop”? How does it interact with other components of Baddeley’s working-memory model? (b) Name and briefly describe two (2) empirical findings supporting the notion that the phonological loop is based on inner speech; (c) How is information kept activated in the phonological loop? How can the amount of activated information be improved?

Question 3 – Long-term memory: (a) Endel Tulving distinguishes two types of declarative memory: Which are these? What is the main difference between declarative and non-declarative memory?; (b) Patients with hippocampus lesions, like patient H.M. or Clive Wearing, are famous for showing a clear *amnesic syndrome*. What are its 5 major symptoms? (c) Design a simple test to check whether skill/procedural learning is affected in amnesia patients.

Question 4 – Music Cognition: (a) Several authors have proposed that music may be an evolutionary adaptation. Mention four (4) potential evolutionary functions of music-making. (b) What kinds of cognitive processes are involved in auditory scene analysis? (c) Why is beat and the ability to perceive a beat so important for music?

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Norsk versjon

Bare tre (3) av de følgende fire (4) spørsmål skal besvares. Hold svarene korte! Svarene kan avgis på engelsk, norsk, svensk eller dansk.

Spørsmål 1 – Persepsjon: (a) Hva er en visuell illusjon? Hva kan vi lære av illusjoner om persepsjon? (b) Forklar "Inverse-problem" av persepsjon. Hvorfor oppstår problemet? (c) Hva er multisensorisk integrasjon? Beskriv et empirisk fenomen som demonstrerer det. Hvordan forklarer "modality appropriate hypothesis" og "maximum likelihood model" fenomenene?

Spørsmål 2 - Arbeidsminne: (a) Hva er «phonological loop»? Hvordan interagerer det med andre komponenter i Baddeley sin arbeidsminnemodell? (b) Gi navn på og beskriv i korte trekk to (2) empiriske funn som støtter forestillingen om at den «phonological loop» er basert på indre tale; (c) Hvordan opprettholdes informasjonen i «phonological loop»? Hvordan kan mengden av oppretthold informasjon bli forbedret?

Spørsmål 3: Langtidshukommelse: (a) Endel Tulving skiller mellom to typer «declarative memory»: Hvilke er disse? Hva er hovedforskjellen mellom deklarativt og ikke-deklarativt minne? (b) Pasienter med hippocampuslesjoner, som pasient H.M. eller Clive Wearing, er kjent for å ha amnesisyndromet. Hva er de 5 viktigste symptomene? (c) Utform en enkel test for å sjekke om ferdighetslæring ("skill/procedural learning") er påvirket hos amnesipasientene.

Spørsmål 4 – Musikk-kognisjon: (a) Flere forfattere har foreslått at musikk kan være en evolusjonær tilpasning. Gi fire (4) mulige evolusjonære funksjoner til å lage musikk. (b) Hvilke typer kognitive prosesser er involvert i auditiv «sceneanalyse»? (c) Hvorfor er «slag» (engelsk: «beat») og evnen til å oppleve «slag» så viktig for musikk?

Exam PSY2300, h 2018, grading instructions

NOTE: The grading instructions are formulated for graders with a background in cognitive psychology. Accordingly, the instructions only highlight the key aspects, which should be discussed in an ideal answer to the given question. The provided instruction should not be seen as example of ideal answers to the questions.

1. General grading instruction

Only 3 of 4 questions listed below had to be answered. Each question gives max. 5 points so that the total exam yields a maximum of 15 points. The instructions below provides guidelines for awarding points by subquestion. Maximal points per sub-question are indicated in brackets (see *Key points to be addressed in answer*). However, should an answer in one subquestion be particularly well formulated it might be used to compensate a “point loss” in another subquestion within the *same* question. Likewise, penalization is possible (i.e., for unstructured writing, or extensively long answers which are not to the point).

Points-to-grade conversion: 5 points (33%) will be the "pass threshold" and grades should accordingly be assigned as:

0-4.99 pts = F,

5-6.99 pts = E,

7-8.99 pts = D,

9-11.99 pts = C,

12-13.99 pts = B,

14-15.00 pts = A.

Cautious note: Please contact me (rene.westerhausen@psykologi.uio.no) if you have any questions or notice any irregularities during grading. For example, in the past it has occurred that one question was too difficult, i.e. no candidate got 5 points in this question. In this case, as all the questions should be of approximately the same difficulty, the grading was adjusted accordingly (i.e., the question was weighted when summing up the total score). Also, I encourage to use an excel table to track the points per question across all candidates. If you do so, please feel free to share it with me after grading so that I can assess difficulty of the

questions and systematic inter-grader differences etc to be able to improve the objectivity of the instruction.

References:

- Question 1, 2, 3 refer to the textbook Gilhooly, K., Lyddy, F. and Pollick, F. (2014). *Cognitive Psychology*. London: McGraw Hill. ISBN13-9780077122669;
- Question 4 to the article Pearce, M., & Rohrmeier, M. (2012). Music cognition and the cognitive sciences. *Topics in Cognitive Science*, 4(4), 468-484. DOI: 10.1111/j.1756-8765.2012.01226.x

2. Questions and key points

2.1 Question 1

- **Perception:** (a) What is a visual illusion? What can we learn from illusions about perception; (b) Explain the “Inverse-problem” of perception. Why does it exist?; (c) What is Multisensory Integration? Describe an empirical phenomenon that demonstrates it. How do the “modality appropriate hypothesis” and the “maximum likelihood model” explain the phenomena?

Key points to be addressed in answer:

(a) Illusions are perception failures; misinterpret a sensory experience. They remind us that Perception is not perfect/distinction “sensation vs perception”. Illusions can be useful as it is in a sense where our perception breaks down, and if we can learn how it breaks down we can learn a lot about how it works. **(1p)** [textbook pages 29-30]

(b) Invers problem: Different objects can create the same image on retina depending on their distance and angle in relation to the retina (see Fig 2.3). Reason: sensory organs have limitations and cannot receive all the available information in the external world and because the information is ambiguous (for example because the 3D world turns to 2D information during the sensory encoding of the world which causes an information lost) **(1 p)** [pages 31-32]

(c) *Msi* = combination of information within and across senses to make a coherent whole perception that is more than each on its own. McGurk or ventriloquist effect can serve as example. The *modality appropriate hypothesis*: each physical property, a particular sensory

modality has a higher acuity to estimate it so it will always dominate “bimodal” estimates of the property and the most appropriate modality is used. (relevant but not necessary explanations: Vision is given priority in spatial tasks. Hearing is given priority in temporal tasks. Vision dominating other senses is termed ‘visual capture’. Critique: Depends on information quality). The *maximum likelihood model* might be an explanation and proposes that most reliable input not the most appropriate modality count. **(3p)** [textbook pages 50/51]

2.2 Question 2

- **Working memory:** (a) What is the “phonological loop”? How does it interact with other components of Baddeley’s working-memory model? (b) Name and briefly describe two (2) empirical findings supporting the notion that the phonological loop is based on inner speech; (c) How is information kept activated in the phonological loop? How can the amount of activated information be improved?

Key points to be addressed in answer:

(a) PL is storage (phonological buffer) AND source of manipulation (articulatory control processes) of phonological information **(1p)**; Three points of interaction: (i) it is controlled by the central executive; (ii) utilizes language information from LTM; (iii) converts visual information (from Visuo-spatial sketchpad) into speech-based information; **(two of these three points well described = 1p)**. [see textbook pages 124-128]

(b) Two of the four findings discussed in the book should be described: word length effect, articulatory suppression, irrelevant speech effect, or phonological similarity effect **(awarding 2 x 1p = 2p)** [see textbook pages 125-128]

(c) By sub-vocal rehearsal **(0.5p)**. Faster rehearsal should also increase the amount of information (see e.g. word length effect/example digit span in different languages) **(0.5p)**. [see pages 125/126]

2.3 Question 3

- **Question 3 – Long-term memory:** (a) Endel Tulving distinguishes two types of declarative memory: Which are these? What is the main difference between declarative and non-declarative memory?; (b) Patients with hippocampus lesions, like patient H.M. or Clive Wearing, are famous for showing a clear *amnesic syndrome*.

What are its 5 major symptoms? (c) Design a simple test to check whether skill/procedural learning is affected in amnesia patients.

Key points to be addressed in answer:

(a) subtypes: semantic vs episodic memory; declarative = explicit memory: requires conscious recollection of events or facts; non-declarative does not. (clear description awards 0.5p per term = **max 1.5p**) [textbook pages 151-154];

(b) Five cardinal symptoms: i) Short-term/Working memory, as measured by digit span for example, is intact (e.g., he answers questions). ii) Memory for language, and concepts, is largely intact (e.g., he knows what a marriage is); iii) There is a severe and lasting anterograde amnesia (e.g., he forgets information his wife just gave him); iv) There will be a retrograde amnesia, (but not complete) – temporally graded loss of memory for events prior to event; v) Skill learning, conditioning and priming will be unaffected (see H.M., p. 144) (**each 0.5 p = 2.5p**). [pages 144-149].

(c) Train a motor skill, like mirror drawing, should improve over days of training, but patient will not remember that he/she trained – however, alternative examples are acceptable if correct (**1p**) . [see p.147]

2.4 Question 4

- **Music Cognition:** (a) Several authors have proposed that music may be an evolutionary adaptation. Mention three potential evolutionary functions of music-making. (b) What kinds of cognitive processes are involved in auditory scene analysis? (c) Why is beat and the ability to perceive a beat so important for music?

Key points to be addressed in answer:

(a) any 4 of the following: sexual selection/attracting mates; facilitating group cohesion and social bonding; facilitating parent-infant bonding and interaction; facilitating cognitive development; facilitating the development of empathy and social interaction skills; co-evolution of music and language (**each 0.5 p = max 2 p**).

(b) source location; grouping; stream segregation (segregating sounding elements into distinct perceptual streams); integration (fusing sounding elements into a single percept or a single stream) (**max 2p**).

(c) A beat provides a predictable pattern for temporal events in music. Beat perception enables the coordination of joint action (music-making) and sensorimotor synchronization (dancing) (**1p**).