Proef/oefen tentamen 2018, vragen

Cognitive Psychology and its Applications (Vrije Universiteit Amsterdam)

Practice Exam: Cognitive Psychology and Its Applications

Lecturer: Dr. Artem Belopolsky
Second reader:

Please answer the questions on the separate VU-exam lined paper.

Better marks will be given to correct answers that are brief and to-the-point.
The language of exam is English.

Make sure to put your name on all exam material you use. Hand in both this copy of the exam and the separate sheet used to answer the questions.

There are 9* questions in total, and you get max one point per question. You get one point for free!

Good luck!

* Practice exam has 5 questions to give you an idea about what types of questions to expect

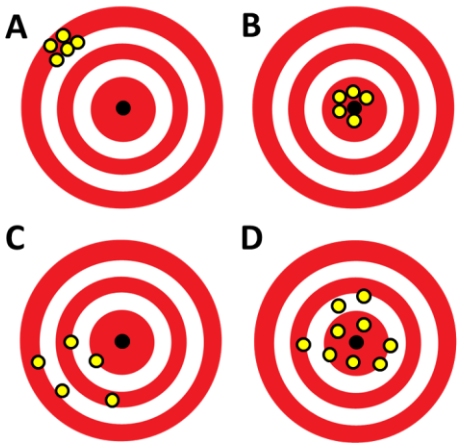
1. Engineering psychology (aka Applied Cognitive Psychology) can be defined as the study of interaction between humans and systems in order to make some improvements. Fill in **3 important ways how changes for the better can be made. You can think of things to improve/reduce/generate, etc. Illustrate each improvement with an example**.

   A. Improve productivity. Develop a computer algorithm that detects faces in the security videos, which can then be reviewed by a human.
   B. Generate knowledge about human-machine interaction. Manipulate different fonts and contrast settings on a website to understand how it affects looking behavior.
   C. Improve safety. Create warning signal that will alert the driver when he is fatigued.

2. In his seminal paper Sperling (1960) discovered a new form of visual memory which he termed "iconic" memory. Name three differences between iconic and visual working memory.

   a. *Short-lived*
   b. *High-capacity*
   c. *Not stable, can easily be overidden*

3. For **eye movement recordings** (or any time series measurement for that matter) it is important to know precision and accuracy of the measuring device that you are using. Four different types of relationship between precision (high and low) and accuracy (high and low) are illustrated below. Each bull's eye illustrates where the person is looking. Yellow circles are samples from an eye-tracker tracking this person's eyes. For each of the four bull's eyes indicate whether precision and accuracy are high or low.
   a. *Accuracy: Low, Precision: High*
   b. *Accuracy: High, Precision: High*
   c. *Accuracy: Low, Precision: Low*
   d. *Accuracy: High, Precision: Low*



4. What is the main difference between **closed-loop** and **open-loop** control?

   In a closed loop the operator adjusts the control based on the negative feedback from his/her actions (prediction error). He continuously monitors the feedback and adjusts performance accordingly. In the open look the operator does not pay attention to the feedback but possesses advanced knowledge or experience to be able to access the situation and choose the right course of action.

5. Computational models of vision (such as the one from Itti & Koch, 2001) have incorporated the knowledge from neuroscience and cognitive psychology to compute visual salience. The steps of **salience models** are illustrated below.

   a. *Describe process 1: Determining the most salient region within each feature map*
   b. *Describe process 2: combining salience maps into the master salience map*
   c. *Describe process 3: attention is allocated to the most salient region and then the next most salient region and so on.*