

Reverse Engineering User Studies

Draft for peer due May 11, 2016, 6:00 AM

Peer review May 11–16, 2016, 6:00 AM

Final submission due May 18, 2016, 6:00 AM

Description

In this assignment, you will practice identifying important elements in experimental research studies. To let you practice the skill in experimental design, you will reconstruct an experimental protocol out of the description in the papers and attempt to fill implicit or missing information that are necessary for a rigorous experimental research.

Prerequisite

You need to skim the reading assignment of this week: [\(McGrath, 1995\) Methodology matters](#) before doing this assignment. You will receive your *main paper* as a mail to your group.

Task

Reconstructing user study protocol: You will create *one* user study protocol from your main paper (if two or more studies are described, choose one). You will need to fill in more details beyond what is described in the paper.

1. The protocol comprises the following sections:

- a. *Context:* Describe background of the research that lead up to this experiment and how the result of this experiment will be a part of further research. This part must stand alone and allow the reader to grasp the importance of this experiment. (100–150 words)
- b. *Aim:* Ordered list of statements describing research questions that this experiment aim to address. Each statement should be simple and specific. Order this list according to their respective priorities.
- c. *Hypotheses:* Ordered list of statements corresponding to the research questions described in the aim. One research question may be decomposed to multiple hypotheses. Each hypothesis must be falsifiable. (See McGrath: Comparison Techniques: Assessing Associations and Differences)
- d. *Independent Variables:* The description of each independent variable must clearly indicate manipulation technique (See McGrath: Techniques for manipulating variables), and possible levels (e.g., the four layer thicknesses in the example protocol).
- e. *Dependent Variables:* Clearly indicate the scale, measurement units (e.g., cm), possible levels, and operational definition that specify unambiguously how to measure each variable.
- f. *Task:* Describe in steps, the task that the participant needs to perform. Add illustrations to clarify the provided stimuli and expected responses from the participants. (You may use figures from the paper and create additional figures here. Should you use any figures from the paper, add proper citations.) The Task section focuses on what generates data for the dependent variables.
- g. *Participants:* Describe characteristics of target participants (e.g., age group, handedness, educational background, gender). Also describe sampling method that will ensure that the recruited participants match the desired characteristics. In this section, you do not need to match what is described in the paper. Aim for an ideal group of participants that represent the target research questions.
- h. *Experimental design:* Describe the experimental design that you used for each of the independent variables, the number of repetitions, matching, randomization, and counterbalancing strategies. This section must include a summary of the total number of trials, e.g., 4 Thickness × 2 repetitions = 8 trials.
- i. *Apparatus:* Describe the hardware and software that you plan to use in your user study as concrete as possible.

- j. *Experiment Procedure*: Describe what the participant will experience from the point that the participant arrives in your lab until she leaves. A part of the Experiment Procedure is that the participant performs what is described in the Task section.
- k. (Not needed in this assignment) *Data Analysis*: Describe the process to clean, summarize, and analyze the data. Ideally, there should be a rough structure of tables and graphs that you aim to create in the analysis process.
- l. *References*: Provide numbered reference to any research articles or other resource in standard ACM reference format.

You may order Task, Hypotheses, and Variables sections differently to minimize redundancy and improve readability of the protocol. Keep the protocol of each study to be within four A4 pages.

2. Indicate parts that the paper did not provide clear indications for and that you specified by yourself by **highlighting** them.
3. Describe how you attempt to establish internal, construct, and external validity in your experiment protocol (see: McGrath: Validity of Findings). Analyze the relationship between IV and DV and evaluate how the authors establish the connection between the experiment to the conclusion. (1 A4 page overall)

Submission

Draft for peer review: Prepare one Google Document and set the permission to allow anyone who has the link to comment. Do not include the name of members in this document. Send the link to wacker@cs.rwth-aachen.de with the subject "A02 Draft". See the due date above.

Peer review: You will receive links to the submissions. Give feedback to them by adding comments in the document. In the final submission, your peer will be able to rate the feedback quality. This will influence the pairing for peer feedback in the next assignment. If you give high quality feedback in this assignment, we will pair you with the team that give high quality feedback for the next round of peer feedback. See Grading section for criteria to give feedback.

Final submission: Send one PDF file (paper size: A4) containing the following parts to wacker@cs.rwth-aachen.de with the subject "A02 Final Submission".

1. Your solution to tasks 1 and 2 (4 pages) as well as task 3 (1 page)
2. Peer feedback rating: Rate the quality of peer feedback from 1 (worst) to 5 (best). You may, optionally, add free-text feedback for the peer feedback here as well. Give one section per group that give you peer feedback.
3. Names and matriculation numbers of team members

Grading:

The submission will be evaluated based on the following criteria:

- Unambiguous: Each element in the protocol allows only one clear interpretation.
- Logical: The described elements are logical consequence from the research question and the described context.