



Consent Form “Code Comprehension EEG Study”

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Purpose

Code comprehension is a critical aspect of software development, influencing both the efficiency and quality of the programming process. By using an EEG (Electroencephalography) system, this lab study aims to investigate the brain activity and cognitive load of developers while solving code comprehension tasks. During approximately 45 minutes, you will engage in various code comprehension tasks. Additionally, subjective feedback on user preference and perceived ease of understanding will be collected. This multi-faceted approach aims to provide an improved understanding of developers' cognitive processes in software development.

Study Procedure and Collected Data

Overall, the study is comprised of an introductory and setup phase (20min), the actual EEG experiment (approx. 45 minutes), and a cleaning phase (5min):

Introduction & Setup (20min): At the beginning of the study, we inform you about the procedure and the data we record. You may freely decide whether you want to participate or not. After signing the consent form, you will be asked to fill in a pre-study questionnaire with questions on demographics. Afterwards, the researcher will place an EEG cap onto your head and attach 32 electrodes to it. In order to be able to measure brain activity with as little interference as possible, we apply an EEG paste selectively between the electrodes and the scalp. Note that your hair might get messy due to the EEG paste. Additionally, auxiliary electrodes will be positioned near the eyes and heart to record any interference caused by eye movements and heartbeats. We optionally ask you to wear EEG ear buds.

EEG Experiment (approx. 45min): During the experiment, the following data will be collected.

- You will look at a total of 24 code snippets with short breaks in between, solving a comprehension task for each of the code snippets. The code snippets are of varying difficulty level. Your answers and metadata about your selected answer will be recorded. Additionally, you will be presented with an introductory example at the beginning of the experiment to get familiar with the setup. No data will be used from the introductory sample.
- After each of the 24 code comprehension tasks, you will be asked to answer a short survey about the presented code. Additionally, the experiment concludes with a short survey about the entire experiment. Your survey answers will be stored.
- For the duration of the experiment, we record EEG data from 32 head cap electrodes and auxiliary electrodes. We only use the EEG data that is collected during stimuli presentation.

Post-Experiment Cleaning (5min): After completing the experiment, the EEG cap and electrodes are dismantled by the researcher. You can then wash off excess EEG paste in the washing room of the lab.



Benefits

As a token of our appreciation, you will receive a compensation of 30CHF. By participating in this study, you are contributing to an ongoing research effort to improve the understanding of cognitive processes during software development.

Risks

There are no immediate risks involved in participating in the study. Some participants might dislike or feel uncomfortable wearing the EEG headcap. Your hair might get messy due to the EEG paste. You are able to withdraw from the study at any time, without providing a reason.

Data Collection

The collected data will be used exclusively for research purposes. This data will be stored and analyzed anonymously. Your name will not be published in any way in reports or scientific publications resulting from this study. Confidentiality will be strictly maintained throughout the study. All persons who are in charge of you in the context of this study are subject to a duty of confidentiality and are obliged to maintain data secrecy. Subject to strict confidentiality, the data may be viewed by experts from the ethics committee for testing and monitoring purposes. You can request that your data shall be destroyed at any time. No justification is necessary.

Uses of the Study Data

For our research, we will only use pseudonyms with your data, and no identifying information will ever be shared outside of the research group and the confines of this study without your explicit permission. The results of this study will be published in a research paper and may potentially appear in both internal and external academic research presentations and publications, such as academic journals and conference proceedings. Data presented in presentations or publications will never allow identifying individual persons.

Contact for Information about the Study

If you have any questions or desire further information with respect to the study, you may contact Tarek Alakmeh (alakmeh@ifi.uzh.ch) or Prof. Dr. Thomas Fritz (fritz@ifi.uzh.ch).

Consent for Study Participation

Your participation in this study is entirely voluntary. You are free to withdraw your participation at any point during the study, without giving any reason and without any negative consequence. Any information you contribute up to your withdrawal will be retained and used in this study, unless you request otherwise.

Please sign the consent form on the next page.



With your signature you confirm the following statements:

- I allow the privacy-preserving recording of EEG data and answers during the experiment.
- I understand the procedures of the study and the applicable conditions.
- I had the opportunity to ask questions. I understood the answers and accept them.
- I am at least 18 years old.
- I am healthy.
- I had enough time to make the decision to participate and I agree to the participation.

In no way does this waive your legal rights or release the investigators or involved institutions from their legal or professional responsibilities.

Name (printed)

Signature

Date

Place