

Consent to Participate in a Research Study (Behavioral Component)

Title of the Project: Understanding Code Synthesis via Functional Magnetic Resonance Imaging

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Invitation to Participate in a Research Study

We invite you to be part of a research study about **software development**. You must be 18 or over to participate in this study.

This consent document consists of two separate parts: 1) A description of the specific research activities you are asked to participate in; 2) An fMRI informed consent that discusses the fMRI scanning process and inclusion of your fMRI images in a research repository.

Description of Your Involvement

If you agree to be part of the research study, we will ask you to complete the following:

- 1. Complete questionnaires that assess your socioeconomic status as well as your social preferences and personality. You can complete these surveys at your leisure before scheduling your fMRI scan.**
- 2. Complete a questionnaire about your programming experience in C, your GPA, and your coursework. (10 minutes)**
- 3. Review a training video in which you will learn how to provide answers for programming questions we will ask you to complete in the fMRI. (10 minutes)**
- 4. Enter the fMRI machine to complete three sequences of questions. You will be asked to complete code writing, prose writing, and code review tasks in the fMRI. You will have 30 seconds to answer each question, with time for breaks between questions and between sequences. (60 minutes)**
- 5. Complete a post-fMRI questionnaire describing your answers in the fMRI. (10 minutes)**

Benefits of Participation

Although you may not directly benefit from being in this study, others may benefit because neural representations of code synthesis in the human brain are unexplored.

In modern Software Engineering, the practice of *software maintenance* - the repair of defects in software - has been shown to be the largest drain of resources. It is, therefore, of great interest to software companies to reduce the number of defects that will need to be repaired. One part of repairing software includes the writing, or synthesis, of new code. The purpose of this study is to learn more about the cognitive processes involved in this task, especially in comparison to two other tasks: writing English prose and code comprehension.

You are being asked to participate in this study because it requires participants with some computer programming skill to perform a number of tasks inside an fMRI machine.

Risks and Discomforts of Participation

There may be some risk or discomfort from your participation in this research. For information about risks or discomforts associated with fMRI scanning, see Section 5 of the fMRI consent document.

In addition, data breaches may result in the disclosure of data. We will ask to audio record your answers to a post-questionnaire, but we will not collect other personally identifying information like your name. Additionally, research data collected from you will be de-identified after collection and stored on an encrypted volume.

Compensation for Participation

For your participation in this research project, you will receive **\$75**. You will receive this money even if you decide to withdraw during the study. If you are excluded from participation in this study based on the screening assessment, you will receive **\$25** instead. You are responsible for traveling to and from the testing facility and any associated parking.

Confidentiality

We plan to publish the results of this study. We will not include any information that would identify you. Your privacy will be protected and your research records will be confidential.

It is possible that other people may need to see the information you give us as part of the study, such as organizations responsible for making sure the research is done safely and properly like the University of Michigan or government offices.

Audio Recording

After completing your fMRI scan, we will complete a brief post-questionnaire asking about your experiences completing the prose and code writing tasks. We ask that you allow us to record these conversations so that we can analyze them later. **We will not ask you for personal information** and we will delete these audio recordings once we transcribe them to an encrypted textual format. While we may quote portions of your responses in publication, we will not disseminate any audio recordings of you or any identifying information about you.

Consent to be Audio recorded

I agree to be audio recorded during the post-questionnaire.

YES _____ NO _____

Signature

Storage and Future Use of Data

We would like to store your data for future research studies. **We will neither collect nor retain your name or other personally identifying information aside from the recording described above. Your research data will be kept in secure storage at the University of Michigan.**

The fMRI consent document seeks separate permission for the retention of your fMRI scans for future research.

Consent to Use Data/Specimens in Future Research

I agree that my data/specimens may be used in future research.

YES _____ NO _____

Signature

Voluntary Nature of the Study

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. **You do not have to answer a question you do not want to answer. Just tell us and we will go to the next question.** If you decide to

withdraw before this study is completed, your data will be destroyed. You will receive compensation even if you decide to withdraw from this study.

Contact Information for the Study Team

If you have questions about this research, including questions about scheduling or your compensation for participating, you may contact Kevin Leach (kyleach@umich.edu) or Westley Weimer (weimerw@umich.edu).

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher(s), please contact the:

University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board
2800 Plymouth Road
Building 520, Room 1169
Ann Arbor, MI 48109-2800
Phone: (734) 936-0933 or toll free, (866) 936-0933
Email: irbhsbs@umich.edu

If you have questions or concerns about the fMRI scanning part of this research, see Part 10 of the fMRI informed consent.

Consent

By signing this document, you are agreeing to be in the study. We will give you a copy of this document for your records. We will keep one copy with the study records. Be sure that we have answered any questions you have about the study and that you understand what you are being asked to do. You may contact the researcher if you think of a question later.

I agree to participate in the study.

Printed Name

Signature

Date