

Consent to Participate in Programming Transfer Training Research Study: 11 Week Training Component

PI: Westley Weimer, PhD, Computer Science, University of Michigan

Co-investigator: Madeline Endres, Computer Science, University of Michigan

Co-investigator: Priti Shah, PhD, Psychology, University of Michigan

Co-investigator: Madison Fansher, Psychology, University of Michigan

Invitation to Participate in a Research Study

We invite you to be part of a research study about software engineering. You must be 18 or over to participate in this study. You must also be currently enrolled in EECS 183, and you must have no prior programming experience before this semester.

This consent document contains a description of the specific research activities you are asked to participate in.

Description of Your Involvement

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

1. **Attend 11 2-hour sessions:** You will be asked to attend one 2-hour session each week for 11 weeks. These sessions will all be located in reserved rooms on campus. The first and last sessions will include various cognitive tests and programming ability tests. These are the pre and post sessions respectively. The middle 9 sessions will contain training for either spatial reasoning or reading comprehension. These 9 sessions are the training sessions.

2. **Pre-test session description:** Complete a questionnaire about your basic information, and your GPA, take a written test measuring your spatial reasoning ability, take a written test measuring your programming ability, take a written test measuring your deductive reasoning ability, and take a test measuring your confirmation bias, take a test measuring your technical reading ability.

3. **Training Sessions Description:** You will be asked to either attend the spatial reasoning training sessions or the reading comprehension training sessions. You will be randomly assigned to one of these two training programs. Regardless of type, each training session will have three parts: Answering questions about specific weekly

activities (5 min), a mini-lecture teaching new material (20 min), and time to work on practice problems (1.5 hrs).

- a. Weekly diaries: At the beginning of each training session, we will ask you to record the number of hours in the previous week that you spent programming or studying for EECS 183. We will also ask how many hours you spent playing video games or other spatially intensive tasks, and how many hours you spent actively reading.
- b. The mini-lecture will either contain strategies for learning how to visualize spatial objects (spatial training) or better understand technical writing (reading comprehension)
- c. The practice problems will contain multiple choice and open-ended questions relating to the material in the mini-lecture

4. Post-test session description: Take a written test measuring your spatial reasoning ability, take a written test measuring your programming ability, take a written test measuring your deductive reasoning ability, take a test measuring your confirmation bias, take a written test measuring your reading ability, and answer a couple of open-ended qualitative questions about your study experience.

Benefits of Participation

Depending on the training session that you are placed in, you may see either an increase in spatial ability or an increase in reading comprehension ability. You may also see a relative increase in programming skills.

Beyond these direct benefits, others may benefit because transfer between cognitive training and computer science performance are unexplored. As some cognitive tasks, such as spatial reasoning, are correlated with success in computer science, this research has the potential to broaden access to computer science. The purpose of this study is to learn more about the cognitive processes involved in learning how to program.

You are being asked to participate in this study because it requires participants who have never programmed before so we can look for any neurological changes as the participant learns.

There may be some risk of temporary discomfort or boredom while attending the testing

and training sessions. These risks are minimal and you are able to stop participating in the study at any time for any reason without consequence.

In addition, data breaches may result in the disclosure of personal data. To mitigate this, all hard paper tests and practice problems will be stored in a secure location, and all digital data will be stored on a secure university server. Furthermore, after the completion of the full training study, research data collected from you will be de-identified and stored on an encrypted volume.

As with any research study, there may be additional risks that are unknown or unexpected.

Compensation for Participation

For each 2-hour training or testing session that you attend, you will receive \$20. You are responsible for traveling to and from the testing facility and any associated parking. This money will be given to you as cash after each session. If you miss more than one training session, you will not be able to receive payment for additional sessions, though you may still attend if you desire. If you miss the pre-test, you will be unable to participate in the study.

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.

Storage and Future Use of Data

We will store your data/specimens for future research studies. Your name and other identifying information will be secured and stored separately from your research data at the University of Michigan.

Consent to Use Data/Specimens in Future Research:

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

YES _____

NO _____

Signature: _____

Participation in Followup Studies

Please indicate if you would like to be contacted for potential followup studies. Such studies would involve retaking the spatial reasoning tests, reading comprehension tests, and programming tests at a later time (up to 1-2 years in the future). Should you consent to being contacted for future follow on studies, you will only be contacted by email. We will also hold onto your names past the end of the study duration in order to contact you.

Consent to be contacted for followup studies:

I would like to be contacted in the case:

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.

The researchers may remove you from the study even if you want to continue your participation if the researchers believe it is not in your best interest to continue, if your condition changes and requires treatment, or if you do not follow the instructions from the researchers (e.g., miss more than one session).

Contact Information for the Study Team

If you have questions about this research, you may contact Madeline Endres (endremad@umich.edu), or Madison Fansher (mfansher@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

Consent

By signing this document, you are agreeing to be in the study. 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