

Informed Consent for Participation in Research Activities

Project Title: Behavioral, eye-tracking and psychophysiological studies of simple decision-making

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Approval Period: 05/11/2022 - 05/19/2023

Purpose of this Research Study:

The purpose of this study is research. This is not a clinical study and we do not provide medical treatment. Understand the algorithms used by the brain to make different types of simple decisions.

While we will be happy to talk to you more about the scientific findings of our work, we will not be able to give you any clinical feedback. This means we cannot tell you how you compare to other people on any measures.

The study will take approximately 1 hour.

If you have any questions about any part of this informed consent, please ask the researcher. Questions are encouraged.

Background:

This research study uses a combination of tools from neuroscience, psychology, and economics to study the neuro-computational basis of simple decision-making. The goal is to the algorithms that humans use to make different types of basic decisions, and how these algorithms interact with basic cognitive process such as attention, working memory and affect.

Who Can Participate:

We anticipate that this research will include up to 2500 male and female participants over the course of five years, in the age ranges of 18-65 Years. Only participants ages 18-65, who are psychologically healthy, will be recruited from the local community, including Caltech undergraduate students, graduate students post-doctoral researchers and staff. In tasks involving eye-tracking, subjects are not allowed to wear glasses during the experiment due to constraints with the eye-tracking equipment, but contacts are allowed.

If you are participating in this research because you are in a class offered by the researchers, or work in the same lab as the researchers, or are otherwise employed by the researchers, it is important that you understand that your participation is still entirely voluntary; you have the right to decline. If you think that you are being unduly pressured to participate, or that you will be penalized in some way for non-participation, please contact the Institutional Review Board (IRB) that is tasked with protecting human subjects at 626-395-8448 or irb@caltech.edu.

What Will Be Done:

Subjects are shown basic choices problems displayed in a computer screen and indicate their decisions using input devices like a computer mouse or keyboard. Eye movements are monitored with a non-invasive eye-tracking system while they make decisions.

The decision problems involve choices among different probabilistic monetary payoffs, snack foods, or other prizes such as books or T-shirts. Subjects make real choices in the sense that they get the stimuli

chosen in a randomly selected subset of the trials. The experiments do not involve deception.

When snack food prizes are used, we use foods that are sold pre-packaged, and the stimuli are selected from those available at local convenience stores and supermarkets. Furthermore, subjects can earn snack food prizes through their choices, but they are NOT forced to eat them.

When snack food prizes are used, we ask the subjects not to eat for 2 hrs prior to the experiment, and we ask them to avoid from eating any foods other than the snack(s) that they earn during the experiment for 1 hr afterwards. Subjects should disregard the fasting instruction if there is a medical concern (e.g., low blood sugar).

These types of experiments and process measurements have been carried out routinely at Caltech by a number of research groups (O'Doherty, Camerer, Rangel, Adolphs, Mobbs).

Subjects are provided with detailed task instructions prior to the beginning of the experiment.

Possible Risks and Discomforts:

The tasks in this study are designed to be similar to decisions we make in daily life, so they are not expected to cause any greater stress or frustration than one might feel during daily decision making. If you are feeling uncertain or anxious or you have questions about a specific test, please ask the investigator to clarify the instructions. You may also stop the testing at any time, and will not be required to provide an explanation.

You are participating in on-campus research during a time when the COVID-19 pandemic is still active, and when new mutations of the virus that causes COVID continue to emerge. Participating in this research may expose you to those viruses and therefore presents some risk of contracting COVID-19. To minimize this risk, it is required that you are fully vaccinated against COVID-19. To participate you must show your valid CDC vaccination card (or California or local government QR code) when you arrive on campus. The researcher will inform you about any additional current COVID-19 safeguarding requirements (e.g. wearing masks or distancing) and you must comply with these requirements in order to participate in this study. Campus requirements include those found on Caltech's website: <https://together.caltech.edu>, as well as any requirements associated with the specific research space or building.

Please do not participate in this study if you feel ill, or if you have been close to somebody known to have COVID-19. Please practice good hygiene and wash your hands before and after you do the study session. If you test positive for COVID-19 after participating in this research, please contact the researcher immediately. If you have any questions about the risks of contracting COVID-19 during this study, please ask the researcher before you participate.

You have been informed that the possible risks and discomforts of this study are as follows:

Physical discomfort: Nothing beyond those associated with normal daily computer usage and reading.

When snack food prizes are used, subjects might experience hunger or cravings during the fasting period, similar to the craving of snacks between regular meals. However, we emphasize that subjects should disregard the fasting instruction if there is a medical concern (e.g., low blood sugar).

Psychological discomfort: Some subjects might experience mild stress associated with uncertainty about their task performance.

Allergy concerns: If applicable, the foods that we use are widely sold at local stores. Subjects might be allergic to some of the foods, but the decision to open a food package and eat it is voluntarily.

Furthermore, we urge participants with allergy concerns to double check the list of ingredients in the food

package, just as they do in daily life.

Possible Benefits:

You personally will not benefit directly from participation in this research study in any way. This research may help extend our understanding of the neuro-computational basis of simple choices, and will provide valuable clues about how to help people make better decisions .

Alternatives:

Your alternative is to choose not to participate in this study.

Compensation:

You are entitled to compensation for participating in this experiment. Your compensation will include an average of \$20-30 per hour. The exact compensation will depend on the decisions made during the experiment. The compensation structure is such that subjects will never make less than \$20 for their participation. This pay for performance is standard practice in experimental economics and has been widely adopted in multiple human subject studies at Caltech. All amounts and their contingencies will be fully disclosed prior to the subject's appointment.

You can quit the experiment at any time. If you quit in the middle of a session, you will still be compensated for the time you participated. Because the payments for financial compensation are arranged via Caltech, it may take about one month before you receive a check.

You will NOT be reimbursed for travel expenses to and from the experiment unless this is specifically arranged ahead of time.

If you receive more than \$600 per year for taking part in studies at Caltech, you may be required to pay taxes on that income. This does not include any payments you receive to pay you back for expenses like parking fees or travel. You may receive an Internal Revenue Service (IRS) Form 1099 if you receive more than \$600 in one year for taking part in these research studies.

Withdrawal from Study:

Your participation is voluntary. If you first agree to participate and then you change your mind, you are **free to withdraw** your consent and discontinue your participation in this study at any time. Your decision will not affect your relationship, if any, with the California Institute of Technology or the Jet Propulsion Laboratory and you will not be penalized or lose any benefits to which you would otherwise be entitled.

To withdraw from the study, you only need to let the experimenter or the principal investigator (Antonio Rangel) know. You can do this by calling them on the phone or email. You will not be asked to explain your reasons. If you wish to withdraw at any time during the experiment, you should notify the experimenter, who will stop testing immediately without penalty.

We may also withdraw you from the study without your consent for scientific or technical reasons. We will not be able to give you detailed explanations of the reasons.

Confidentiality of Records:

Any information from this study in which you might be identified will be confidential. By signing this form, however, you allow the study investigators to make your records available to the Caltech Institutional Review Board Office and regulatory or funding agencies as required by law. If information generated by this study is published, you will never be identified by name.

Data collected from this study will be kept in Antonio Rangel's laboratory at the California Institute of Technology. We will take reasonable steps to ensure that no unauthorized person will have access to the data generated by this study. Paperwork about this research will be kept in a locked file and digital data will be password protected.

Due to the small size of the undergraduate population at Caltech, it may be possible for somebody to discover your identity from your responses to certain questions. From the outset, all data collected in the experiment is stored in all databases without any personal identifiers. The only way of mapping individuals to data is through a hard copy file linking subject numbers to individual names, which is kept stored in a closed lab office in non-electronic form. In addition, the datasets only contain behavioral choices and eye-movements, and thus do not contain any personal identifiers.

All data are stored and published in an anonymized format. The only demographic information that we collect is gender and age, and this information is only reported using group aggregate statistics (e.g., means and ranges). Furthermore, we do not collect any Caltech-specific data from students.

Future Contact:

We may wish to contact you in the future, by email or phone, about participating in other research studies at Caltech.

Please initial one option below to indicate whether or not you consent to us contacting you in the future:

Limited to Research Funded by Non-Profit Organizations

_____ I consent to having Caltech researchers contact me about other studies at Caltech that are funded by non-profit organizations, government agencies, universities, and other non-commercial entities.

Limited to Research Funded by For Profit Companies

_____ I consent to having Caltech researchers contact me about other studies at Caltech that are funded by for-profit companies and other commercial entities.

Contact Allowed Regardless of Funding

_____ I consent to having Caltech researchers contact me about any other studies at Caltech, regardless of regardless of who is funding the research.

Do Not Contact Me

_____ I do not wish to be contacted about participating in future research studies.

Offer to Answer Questions and Research Injury Notification:

The principal investigators or their research associates have offered to answer any and all questions regarding your participation in this research study. If you have any further questions or in the event of a research related injury, you can contact the principal investigator at 626-395-4091 (Antonio Rangel), or the Caltech Institutional Review Board Administrator at (626)395-8448 or at irb@caltech.edu.

Explanation of Treatment and Compensation for Injury:

In the unlikely event of illness or physical injury resulting during participation in this research, the principal investigator and the research study staff will assist you in obtaining appropriate medical treatment by summoning the paramedics by calling Caltech Security (x5000). Should the medical professionals

determine a need, you will be transported to the nearest hospital emergency room. In most cases this would be Huntington Hospital located in Pasadena. This study does not provide financial assistance for medical or other related costs. Your insurance carrier will be billed for the cost of such treatment. You, however, do not waive any legal rights by signing this form.

Voluntary Participation with Right of Refusal:

You have been informed that your participation in this research study is voluntary. You are free to withdraw your consent for participation in any part of this study without any penalty.

IRB Review and Impartial Third Party:

This study has been reviewed and approved by the Institutional Review Board (IRB) of the California Institute of Technology. A representative of that board, from the IRB Office, is available to discuss the review process or your rights as a research subject. The telephone number of the IRB office is 626-395-8448 and their email is irb@caltech.edu.

Sponsor of this Research:

NOMIS Foundation & Caltech Internal Funds

Signature for Consent: The above-named investigator has answered your questions and you agree to be a research subject in this study. You have carefully read the information contained above in the "Experimental Subject's Bill of Rights" and understand fully your rights as a potential subject in a research experiment involving people as subjects.

Print Subject's Name: _____ Date: _____

Subject's Signature: _____ Date: _____

Parent or Guardian's Name: _____ Date: _____

Parent or Guardian's signature: _____ Date: _____
(only if subject is younger than 18)

Print Investigator's Name: _____ Date: _____

Investigator's Signature: _____ Date: _____

Informed Consent Version Name: 19-0201:Renewal 3rd:Expedited Approval

Experimental Subject's Bill of Rights:

You have been asked to participate as a subject in a research study. Before you decide whether you want to participate in the study, you have a right to:

- a. Be informed of the nature and purpose of the experiment;
- b. Be given an explanation of the procedures to be followed in the research experiment, and any drug or device to be utilized;
- c. Be given a description of any attendant discomforts and risks reasonably to be expected from your participation in the experiment;
- d. Be given an explanation of any benefits reasonably to be expected from your participation in the experiment;
- e. Be given a disclosure of any appropriate alternative procedures, drugs or devices that might be advantageous to you and their relative risks and benefits;
- f. Be informed of the avenues of medical treatment, if any, available to you after the experimental procedure if complications should arise;
- g. Be given an opportunity to ask any questions concerning the research experiment or the procedures involved;
- h. Be instructed that consent to participate in the experimental procedure may be withdrawn at any time and that you may discontinue participation in the research experiment without prejudice;
- i. Be given a copy of this form and the signed and dated consent form; and
- j. Be given the opportunity to decide to consent or not to consent to the research experiment without the intervention of any element of force, fraud, deceit, duress, coercion or undue influence on your decision.

I understand my rights as described above:

Signature of participant