

## Informed Consent for Participation in Research Activities

**Project Title:** Behavioral and eye-tracking studies of simple choice

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**Approval Period:** 05/19/2023 - 05/18/2024

**Project Summary:**

This research uses a combination of behavioral experiments and eye-tracking to study the neuro-computational basis of simple human decision-making.

**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.

To improve our understanding of the algorithms that humans use to make different types of basic decisions, and how these algorithms interact with basic cognitive processes such as attention, working memory and affect.

The goal of my research is to characterize in depth the neurocomputational basis of simple choice, and to use this knowledge to understand why we are able to make good decisions in some situations but not others, and why some people are better decision makers than others. This description contains two important pieces of scientific jargon that is important to unpack. First, is the term "simple choice", or "basic decision making". Every day we make hundreds of decisions, big and small, carefully and automatically, that vary substantially in their complexity. At one extreme are simple choices such as whether to have an apple or an orange for an afternoon snack. At the other extreme are decisions such as whether or not to hire a job applicant, or which stock portfolio to select for a retirement savings plan. Basic or simple choices, like apples vs. oranges, provide the simplest possible experimental setting for studying how decisions are made. Second, is the term "neurocomputational basis", which simply means answering the following three questions: 1) What are the algorithms used to make different types of simple choices?, 2) How are these algorithms implemented and constrained by the brain?, and 3) How do these algorithms map into behavior and subjective experiences?

We focus on understanding simple choice for several reasons. First, simple choices are the foundation for the entire field of neuroeconomics and all of its applications. In particular, evolution's tendency to re-use systems, as well as other lines of evidence, suggest that complex choices rely on the circuitry of simple choices, which means that understanding simple choices is a key step in understanding more complex choices. Second, whereas humans, monkeys and rodents make simple choices, many other types of more complex decisions seem to be uniquely human. This makes simple choices methodologically invaluable. Third, simple choices are interesting on their own because, although they do not have the same stakes as more complex choices, we make them constantly. As a result, over time they have a profound aggregate impact on our lives. Fourth, despite its importance, and very wide range of applications, our understanding of the basic foundational questions listed above is still in its infancy.

Although 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.

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

**Duration:**

~ 1 hour

**Who Can Participate:**

We anticipate that this study will include approximately 2500 participants in the age ranges of 18-65 years.

Participants include: Psychologically healthy, normal subjects, ages 18-65, will be recruited from the local community, including undergraduate students, graduate students, staff, and post-doctoral researchers at Caltech.

The following will disqualify you from participation in this study: 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. Participants will not be recruited from Prof. Rangel's classes.

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](mailto:irb@caltech.edu).

**What Will Be Done:**

Subjects are shown basic choices displayed on a computer screen and indicate their decisions using input devices like a computer mouse or keyboard. Subjects' 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, subjects are NOT asked to fast.

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 specific task instructions in written form.

**Eye Tracker Study:**

Eye tracking uses a high speed camera to track the movement of your eyes and where you are looking. It does not require any physical contact, although we may ask you to wear a sticker on your forehead or rest your chin on a chinrest to help the tracker see your eyes better.

We will use the eye tracker for the duration of the session (~ 60 minutes) except during a few short breaks.

We will ask you to sit still in a comfortable position for the duration of each recording period; there are generally 2-4 recording periods per session. We will ask you to look attentively at a computer screen and follow instructions. The experimenter may ask that you tie back hair or remove eye makeup if it interferes with tracking.

**Data and Biospecimens**

In this study, the following data about you and/or biospecimens will be collected and studied: Behavioral Measurements, Instrument or Device Data/Measurements

From the outset, all data collected in the experiment are 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. All digital information will be password secured.

In addition, the datasets only contain behavioral choices and eye-movements, and thus do not contain any personal identifiers.

Data will be stored indefinitely and separately from the key linking subject numbers with any identifiable information. Any electronic documents will be secured with a password and any hard copies will be kept in a locked office.

**Possible Risks and Discomforts:****Risks & Discomforts Associated with Devices**

Device	Risk Description
Eye Tracker	There are no risks associated with eye tracking beyond those encountered in daily life.

**Risks & Discomforts Associated with Participant Activities**

Activity	Risk Description
Physical Discomfort	Nothing beyond those associated with normal daily computer usage and reading.  In tasks using food prizes, some subjects might experience mild food cravings, but nothing beyond what they encounter walking in any supermarket.
Psychological Discomfort	Some subjects might experience mild stress associated with uncertainty about their task performance. These risks are minimal and are further minimized by fully informing subjects about the details of each task before they carry out the experiment, avoiding deception, and assuring them that the experimental results are anonymized.
Food/Drink	The foods that we used are widely sold at local stores, including the Caltech Red Door Café. Subjects might be allergic to some of the foods, but the decision to open a food package and eat it is voluntary. Furthermore, at the time any food prizes are handed out subjects will be reminded to check the list of ingredients in case of allergy concerns.

The experimental tasks are designed to resemble the type of decisions that we repeatedly make in daily life, and thus they are not expected to cause any greater stress or frustration than one might feel during daily decision making.

To further minimize these concerns, we will fully inform subjects about the details of each task before they carry out the experiment, avoid deception, and make it clear to participants that choices made during the test do not have long-term consequences. Furthermore, we will emphasize in the initial instructions that participants may cease testing at any time without penalty.

There may be additional risks with this research that are currently unforeseeable. Please do not participate in this study if you feel ill.

**Collaborative Study/Sharing Research Data:**

Following best open science practices, data may be shared with other researchers upon request, but never with identifiable information.

**Site Specific Language:**

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 other acceptable vaccination card as described on Caltech's website: <https://together.caltech.edu>. As the pandemic situation is fluid, you must abide by all requirements for campus access specified on this website, which may include a requirement to wear a mask. The researcher will inform you about any additional current COVID-19 safeguarding requirements specific to this study (e.g. wearing masks or distancing) and you must comply with these requirements in order to participate in this study.

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.

**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 There is no direct benefit to the subject from participating in this study and minimal risk. However, the results of these studies will provide important insights about the neuro-computational basis of simple

choices, and clues about how to help people make better decisions.

**Alternatives:**

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

**Future Use and Data/Biospecimen Sharing:**

These data/biospecimens Behavioral Measurements, Instrument or Device Data/Measurements will be used for future study.

Data will be stored separately from the key linking subject numbers with any identifiable information. Any electronic documents will be secured with a password and any hard copies will be kept in a locked office.

This study will require the storage and maintenance of your anonymized data or biospecimen for secondary research that may be different from this study. Your data or biospecimens may be shared with other investigators, research, academic or medical institutions, and/or placed into repositories. indefinitely You will not be informed about the details of any specific research studies that might be conducted. This includes not knowing the purpose of the research. You will also be consenting to a research study that you may not otherwise have chosen to consent to. With the exception if incidental findings, no clinically relevant research results will be disclosed to you. If you have any questions regarding your rights regarding storage and use of your data and/or specimen in the future, please contact Antonio Rangel.

Although the researchers will take every reasonable precaution to keep any identifiable data we collect from you confidential, they cannot guarantee this. If you have concerns about the confidential use of the data the researchers plan to collect from you, you should not participate in this study.

The future use of your data and/or biospecimen in research may result in new products, tests, or discoveries which may have potential commercial value. You do not retain any property rights to these materials. As such, you would not share in any financial benefits from these products, tests, or discoveries.

\_\_\_\_\_ I consent to my data and/or biospecimen being saved and used for future research

**Future Contact:**

The researchers may wish to contact you in the future, by email or phone, about performing additional tasks on this study or about participation in a related, follow-up study. Please initial below, indicating your consent to the researchers contacting you.

\_\_\_\_\_ I consent to being contacted to participate in additional tasks for this study or to participate in future related studies.

\_\_\_\_\_ I do not wish to be contacted about future participation in this study or related studies.

The researchers may wish to contact you in the future, by email or phone, about participating in other research studies at Caltech. To be able to contact you under these circumstances, you must agree to provide your contact information, including your name, email, and phone number. Please initial one option below to indicate whether or not you consent to the researchers 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 other research studies at Caltech.

**Confidentiality of Records:**

Any information from this study in which you might be identified will be confidential. We will take reasonable steps to ensure that no unauthorized person will have access to the data and/or biospecimens used or created in this study. If the information generated during this study is published, you will never be identified by name. By signing this form, however, you allow us to make your records available to the Caltech Institutional Review Board (IRB) and administrative authorities, Collaborators and their IRBs, and Regulatory Agencies as required by law.

Due to the small size of the Caltech community, it may be possible for somebody to discover your identity from your responses to certain questions.

**Compensation:**

You are entitled to compensation for participating in the study. Subjects will be paid an average of \$20-30 per hour for their participation. The exact compensation will depend on the decisions that subjects make during the experiment. The compensation structure will be 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 in the recruitment information prior to the subject's appointment.

You can quit the study or any session at any time. If you quit in the middle of a session, you will still be compensated for the time you participated. If we remove you from a study due to scientific or technical reasons, you will be compensated for the time you participated.

If you receive more than \$600 in one year for taking part in these research studies, Caltech must report this income to the IRS and you will receive an Internal Revenue Service (IRS) Form 1099. You are responsible for paying any tax that is due on payments you receive for such participation. You are encouraged to consult with your tax advisor to determine your tax obligations on this income whether or not you receive a 1099.

**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.

**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 researcher 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.

**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, or the Caltech Institutional Review Board Administrator at (626)395-8448 or at [irb@caltech.edu](mailto:irb@caltech.edu).

**Sponsor of This Research:**

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**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.

**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 participant. The telephone number of the IRB office is 626-395-8448 and their email is [irb@caltech.edu](mailto:irb@caltech.edu). The telephone number of the IRB Chair is 626-395-4486 and the email is [radolphs@caltech.edu](mailto:radolphs@caltech.edu).

**Signature for Consent:** The above-named investigator has answered your questions and you agree to be a research participant 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 participant in a research experiment involving people as participants.

Print Participant's Name: \_\_\_\_\_ Date: \_\_\_\_\_

Participant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Print Investigator's Name: \_\_\_\_\_ Date: \_\_\_\_\_

Investigator's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**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