PROTOCOL
Soc-Behav-Ed Exempt
Berkeley

Protocol # 2020-06-13361
Date Printed: 09/25/2020

Protocol Title: Prospective reasoning in a browser-based experiment
Protocol Type: Soc-Behav-Ed Exempt
Date Submitted: 09/06/2020
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* * * Amendment Application * * *

Amendment Application

1. **Summarize the amendment (or proposed changes) you wish to make to your study.**
   Adding a new research assistant to the study.

2. **Explain the reason(s) for the proposed amendment(s).**
   We are bringing in a new research assistant to help with operating and analyzing experimental data.

3. **Indicate how the change(s) impact the level of risk to subjects:**

	Increase
Y	No Change
	Decrease

4. **Describe any effects the change(s) will have regarding risk(s) to the subjects:**
   N/A

5. **Will this amendment require the re-consent of any currently enrolled subjects?** N

   If YES, please explain.

6. **Is this modification consistent with the scope of research activities as described in the proposal(s) for the grant(s) funding the research? (Check N/A if you have no external funding.)** Y

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* * * Personnel Information * * *

Enter all study personnel (if not previously entered) and relevant training information. Please read Personnel Titles and Responsibilities: Roles in eProtocol before completing this section.

Note: The Principal Investigator or Faculty Sponsor, Co-Principal Investigator, Student or Postdoctoral Investigator, Administrative Contact, and Other Contact can EDIT and SUBMIT. Other Personnel can only VIEW the protocol.

Principal Investigator or Faculty Sponsor

Name of Principal Investigator	Degree (e.g., MS/PhD)	Title
John Chuang		Professor
Email	**Phone**	**Fax**
chuang@ischool.berkeley.edu	+1 510 642-7253	+1 510 642-5814
Department Name	**Mailing Address**	
School of Info Operations	94720-4600	

UCB status (select all that apply):

X	Faculty		Postdoc		Grad		Undergrad		Other		

Faculty (with some exceptions), staff, and students engaged in human subjects research must complete either the biomedical or social-behavioral human research course through the online Collaborative Institutional Training Initiative (CITI), depending upon which is most germane to the research. ALL PIs on an NIH award are required to complete either CITI or NIH Training. See Training and Education for more information.

If applicable, please insert date (mm/dd/yy) of completion in appropriate box(es) below:

CITI	NIH	Other Training (title & date completed)

Student or Postdoctoral Investigator

NOTE: All Student/Postdoc Investigators must have a Faculty Sponsor who will serve as the "responsible researcher." If NOT a student or postdoc project, enter student(s) and/postdoc(s) under Other Personnel below.

Name of Student/Postdoc Investigator	Degree	Title
Jeremy Gordon	PhD	Student
Email	**Phone**	**Fax**
jrgordon@berkeley.edu	4157020243	
Department Name	**Mailing Address**	
School of Information		

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If applicable, please insert date (mm/dd/yy) of completion in appropriate box(es) below:

CITI	NIH	Other Training (title & date completed)
9/13/2017		

Other Personnel

Name	Degree	Title	Department Name
Wesley Deng	BS	Research Assistant	EECS Dept Operations

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* * * Vulnerable Subject Checklist * * *

Vulnerable Subject Checklist

Yes	No	
	N	Children/Minors
	N	Prisoners
	N	Pregnant Women
	N	Fetuses
	N	Neonates
	N	Educationally Disadvantaged
	N	Economically Disadvantaged
	N	Cognitively Impaired
	N	Other (i.e., any vulnerable subject population(s) not specified above)

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* * * Study Sites * * *

Study Sites

Select all study sites where data collection via subject interaction will take place:

International

International Site(s) (specify country, region, and township or village)

Local

X UC Berkeley

UC Davis

UC Irvine

UC Los Angeles

UC Merced

UC Riverside

UC San Diego

UC San Francisco

UC Santa Barbara

UC Santa Cruz

Lawrence Berkeley National Laboratory

Alameda Unified School District (specify schools below)

Berkeley Unified School District (specify schools below)

Oakland Unified School District (specify schools below)

X Other (Specify other Study Sites)

Study will occur online using Amazon's Mechanical Turk platform for recruitment.

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* * * General Checklist * * *

General Checklist

Yes	No	
	N	Is the research receiving any federal funding (e.g., NIH, NSF, DOD, etc.)?
	N	Is another campus relying on UC Berkeley for IRB review by means of the UC System Memorandum of Understanding (MOU)?
	N	Is another institution relying on UC Berkeley for IRB review by means of an Inter-institutional IRB Authorization Agreement?
Y		Will subjects be compensated for participation?
	N	Will any type of deception or incomplete disclosure be used? If yes, submit a non-exempt application.
	N	Do investigators have a Conflict of Interest (COI)? If yes, submit a non-exempt application.

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* * * Funding * * *

Funding Checklist

NOTE: Only the Principal Investigator (PI) of the grant or subcontract can add his or her own SPO Funding information in this section. The PI of the grant must also be listed in the Personnel Information section of the protocol in one of the following roles: Principal Investigator or Faculty Sponsor, Student or Postdoctoral Investigator, Co-Principal Investigator, Administrative Contact, or Other Contact. Training Grants can be added by anyone in one of the aforementioned roles. For step-by-step instructions, see Add SPO Funding Quick Guide

Not Funded

SPO - Funding

Funding - Other

Funding Type	Funding Type	Sponsor/ Provider	#	Title	Amount	Begin	End	Narrative Description	Lead PI (If different from Protocol PI)

Funding - Other

Funding Type	**Other** PI departmental research funding
Sponsor/Provider	Chuang, John
#	
Title	Departmental research funding
Amount	5000
Begin	07/01/2020
End	11/30/2020
Narrative Description	
Lead PI **(If different from Protocol PI)**	

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* * * Exempt Paragraph(s) * * *

Exempt Paragraphs

Federal Policy for the Protection of Human Subjects (45 CFR 46) identifies categories of research activities involving human subjects that may be exempt from some of the requirements of subcommittee (expedited) or full committee review. In addition, UCB utilizes flexibility within the regulations to allow certain non-federally regulated activities to be exempted under UCB-defined category #70 (formerly #7). For more information and examples of exempt research, see <a href='https://cphs.berkeley.edu/exempt.pdf' target=blank > CPHS Guidelines on Exempt Research.

Exempt determinations must be made by OPHS Staff and the research must not begin until you have received notification that the research was determined to be exempt.

Select one or more of the following exempt categories. If research activities do not fit into one or more exempt categories, complete a non-exempt application.

NOTE: Certain research activities are not eligible for exempt status because additional protection has been required by federal regulations for vulnerable populations. Specifically, the following do not qualify for exempt status: (1) survey or interview of children; (2) observation of the public behavior of children when investigators interact with the children; (3) interactions with children; and (4) research involving prisoners except for research aimed at involving a broader subject population that only incidentally includes prisoners.

1. EDUCATIONAL PRACTICES: Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact student's opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most:

   i) Research on regular and special education instructional strategies; OR

   ii) Research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

   *This category does not apply to use of school records of identifiable students or interviewing instructors about specific students.

2. EDUCATIONAL TESTS (COGNITIVE, DIAGNOSTIC, APTITUDE, ACHIEVEMENT), SURVEY PROCEDURES, INTERVIEW PROCEDURES, OR OBSERVATION OF PUBLIC BEHAVIOR (INCLUDING VISUAL OR AUDITORY RECORDING): Research involving these procedures is exempt, IF one of the following is correct:

   i) Any information obtained is recorded in such a manner that subjects CANNOT be identified, directly or through identifiers linked to the subjects; OR

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ii) Any disclosure of the subject's responses outside of the research could NOT reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, educational advancement, or reputation; OR

iii) Any information obtained is recorded by the investigator in such a manner that the identity of the human subjects CAN readily be identified, directly or through identifiers linked to the subjects, AND an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

*Workplace meetings and activities, as well as classroom activities, are not considered "public behavior."

3. RESEARCH INVOLVING BENIGN BEHAVIORAL INTERVENTIONS in conjunction with the collection of information from adult subjects through verbal or written response (including data entry) or audiovisual recording, if the subject prospectively agrees to the intervention and information collection, is exempt, IF:

i) Any information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be identified, directly or through identifiers linked to the subjects; OR

ii) Any disclosure of the subject's responses outside of the research could NOT reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, educational advancement, or reputation; OR

iii) Any information obtained is recorded by the investigator in such a manner that the identity of the human subjects CAN readily be identified, directly or through identifiers linked to the subjects, AND an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if at least one of the following criteria is met:

i) The identifiable private information or identifiable biospecimens are publicly available; OR

ii) The information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects, and the investigator does not contact or re-identify subjects; OR

iii) Exempt category 4iii is not in use at UC Berkeley.

iv) The research is conducted by, or on behalf of, a Federal department or agency using

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government-generated or government-collected information obtained for nonresearch activities, if the research generates identifiable private information that is or will be maintained on information technology that is subject to and in compliance with section 208(b) of the E-Government Act of 2002, 44 U.S.C. 3501 note, if all of the identifiable private information collected, used, or generated as part of the activity will be maintained in systems of records subject to the Privacy Act of 1974, 5 U.S.C. 552a, and, if applicable, the information used in the research was collected subject to the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq.*

5. **Research and demonstration projects that are conducted or supported by a Federal department or agency, or otherwise subject to the approval of department or agency heads (or the approval of the heads of bureaus or other subordinate agencies that have been delegated authority to conduct the research and demonstration projects), and that are designed to study, evaluate, improve, or otherwise examine public benefit or service programs, including procedures for obtaining benefits or services under those programs, possible changes in or alternatives to those programs or procedures, or possible changes in methods or levels of payment for benefits or services under those programs. Such projects include, but are not limited to, internal studies by Federal employees, and studies under contracts or consulting arrangements, cooperative agreements, or grants. Exempt projects also include waivers of otherwise mandatory requirements using authorities such as sections 1115 and 1115A of the Social Security Act, as amended.**

   i) Each Federal department or agency conducting or supporting the research and demonstration projects must establish, on a publicly accessible Federal Web site or in such other manner as the department or agency head may determine, a list of the research and demonstration projects that the Federal department or agency conducts or supports under this provision. The research or demonstration project must be published on this list prior to commencing the research involving human subjects.

6. **TASTE AND FOOD QUALITY EVALUATION AND CONSUMER ACCEPTANCE STUDIES: This research is exempt, IF:**

   i) Wholesome foods without additives are consumed; OR

   ii) A food is consumed that contains a food ingredient at or below the level and for a use found to be safe by the Food and Drug Administration (FDA) or approved by the Environmental Protection Agency (EPA) or the Food Safety and Inspection Service (FSIS) of the US Department of Agriculture (USDA); OR

   iii) A food is consumed that contains an agricultural chemical or environmental contaminant at or below the level found to be safe by the FDA or approved by the EPA or the FSIS of the USDA.

X 70. **RESEARCH THAT INVOLVES NO GREATER THAN MINIMAL RISK TO SUBJECTS, BUT DOES NOT CONFORM TO A SPECIFIC EXEMPT CATEGORY UNDER 45 CFR 46.104(d) (exempt categories 1 through 6).**

Category 70 minimal-risk exempt research activities that may include (but are not limited to) non-physically invasive interventions or performance of tasks. See CPHS guidelines on

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Exempt Research and Quick Guide for Exempt Category #70 for more information including exclusions and examples.

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* * * Purpose,Study Procedures and Background * * *

Title

Prospective reasoning in a browser-based experiment

Complete Sections 1 - 9. Specify N/A as appropriate. Do not leave any required sections blank.

1. Purpose of the study

a) Provide a brief explanation of the proposed research, including specific study hypothesis, objectives, and rationale.

Our study aims to investigate visual exploration and path planning behavior in the context of uncertainty. In particular, we are interested in the use of prospective visual exploration during the assessment of potential paths, and the effect of anticipated ambiguity (e.g. the possibility that a path is not passable) on planning and decision-making.

Toward this end, we plan to conduct a browser-based interactive experiment requiring subjects to explore and navigate through an abstract landscape to obtain rewards.

Our primary research questions are:

1) What strategies do subjects use to address path ambiguity, and weigh anticipated reward with uncertainty about path connectedness? How do "visual" exploration paths compare with, support, and differ from chosen action paths? Does exploratory behavior (both visual and movement-based) focus on maximally ambiguous path segments?

2) How well do existing computational models of perception and action predict subject behavior on this task?

By conducting an experiment involving highly constrained spatial navigation as well as visual search, we will be able to compare human behavior in the designed task with a number of computational models prevalent in the literature. Such models, such as Active (Bayesian) Inference and free energy minimization, have been proposed to explain how agents actively collect task-salient information about an environment, and simulate potential action trajectories, in order to balance risk, uncertainty and reward maximization.

Experimental tools enabling eye-tracking are still not sufficiently mature to allow remote eye-tracking and pupillometry-based research, so the use of the cursor to illuminate the tasks's spatial map is proposed to give experimenters access to performance information related to visual exploration.

2. Background

a) Give relevant background (e.g., summarize previous/current related studies) on condition, procedure,

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product, etc. under investigation, including citations (with attached bibliography) if applicable.

In this work, we aim to develop and empirically test a computational model of prospective path-finding under visual uncertainty, building off of existing theoretical frameworks in cognitive science.

Active Inference (Friston et al., 2016) is a framework with origins in cybernetics that extends and formalizes the Bayesian Brain hypothesis while maintaining a commitment to enactive and embodied cognition. Computational models implementing Active Inference see inference as an iterative and fundamentally sensorimotor process driven by "The minimization of prediction error by performing actions that confirm sensory predictions... [or] to disambiguate among competing perceptual hypotheses" (Seth, 2015). This framework has been applied in numerous domains, and recent work has demonstrated that Active Inference can be fruitfully applied to planning and sequential decision-making by enabling an agent to infer its own expected future beliefs (Friston et al., 2020).

Embodied Choice (Lepora & Pezzulo, 2015) is a computational model which argues that decision-making is a highly dynamic and necessarily embodied process (in contrast to prior cognitivist views of serial processes of perception, planning and action) and highlighting the bidirectional influences between action and decisions. EC allows anticipatory action preparation in order to reduce delays, even before deliberation is complete: "...action dynamics alter the value of certain prospects... [and create] commitment effects to the initially preferred choice" (Burr, 2016). Embodied Choice provides an explanation of the value of action simulation, in which individuals enact motor sequences during planning to better assess the costs and sensorimotor consequences of a candidate action plan.

In this work, we will empirically measure correlates of these dynamics such as action simulation and prediction-error minimizing exploration (operationalized as visual search) during a novel goal-directed human decision-making task.

3. Collaborative Research

a) **If any non-UCB institutions or individuals are engaged in the research, explain their human research roles and what human subjects training they have/PI has planned to provide.**

N/A

b) **If any non-UCB institutions or individuals are collaborating in the research, complete the table below and attach any relevant IRB approvals in the Attachments section.**

4. Study Procedures

a) **Describe in chronological order of events how the research will be conducted, providing information about all study procedures and who will conduct each (e.g., how participants are identified, the consent process, interventions/interactions with subjects, data collection), including follow-up procedures. If any interviews, questionnaires, surveys, or focus groups will be conducted for the study, explain and attach one copy each of all study instruments (standard and/or non-standard) in the Attachments section. Please see eProtocol Attachments Check List for Exempt Applications for more information. Indicate frequency and duration of visits/sessions, as well as total time commitment for participants in the study and an estimated time frame**

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for when the study will be completed. If the proposed research involves secondary use of data/specimens, describe how data/specimens will be acquired.

Subjects will be approached through Amazon's Mechanical Turk platform. We will post an ad for an external "HIT", which respondents are free to elect to complete. Subjects will be screened for age (over 18) and location (U.S.) requirements and the HIT will only appear to those who meet these criteria.

Subjects accepting the HIT will first see a consent form and be asked to provide consent. The consent form contains the following required information: the identity and affiliation of the researcher, a description of the study procedures and data usage (including the deletion of the link between experiment data and MTurk ID within 2 weeks, and the indefinite retention of deidentified study data and MTurk IDs), a statement indicating this is a research study and participation is voluntary, contact information in case of questions, and the CPHS protocol ID.

After providing consent, subjects will be linked to the interactive experiment hosted on Google Cloud Platform. All interactions with the experimental server use a secure transport protocol (HTTPS). Approval for use of Google Cloud Platform and our experimental protocol were received from Josh Kwan, a Security Analyst on the Berkeley Information Security Office's Assessments Team.

Subjects that do not provide consent will not proceed any further.

Consenting subjects will then begin the interactive experiment. The experiment begins with a short tutorial introducing them to the task (see Attachments > Tutorial Screens.png), explaining the dynamics of each trial and how the final score is calculated. When ready, subjects begin the experiment, which takes no more than 20 minutes.

The experiment is composed of a fixed number of trials, where each trial instantiates a map on the screen composed of many draggable "holds" (see Attachments > Main Experiment Screen.png). Holds are visible only when illuminated by a light attached to the cursor, and thus moving the cursor around the screen allows the subject to "explore" the landscape. Clicking with the mouse on any hold within the reach zone (indicated by a larger circle at the center of the screen) allows the subject to drag the landscape and bring it toward the center of the screen, thus enabling them to navigate within the landscape. One or more holds are larger and green in color, and represent "goals" which offer a reward when reached. Each trial is completed when any goal is reached (brought to the center of the screen), or when a 60-second trial timer expires. Subjects will complete up to 15 trials.

At the end of the experiment, subjects will be shown their score and reward amount, and will receive a unique code to input into Mechanical Turk, which will allow them to be compensated. All respondents completing the task will receive the base rate of $2, with a potential bonus of $2 dependent on task performance for a maximum incentive amount of $4. The bonus will be calculated based on the final score achieved by the subject as follows:

Over 60% of maximum possible score: $1
Over 90% of maximum possible score: $2

Incentives were chosen to ensure that even without receiving a performance bonus, workers will receive close to an average hourly rate (assuming a 20 minute session) of $6, which is considered typical for academic research in Mechanical Turk.

b) State if photographing, audio, or video recording will occur and for what purpose (e.g. transcription, coding facial expressions).

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facial expressions).

N/A

c) Alternatives to Participation

Describe appropriate alternative resources, procedures, courses of treatment, if any, that are available to prospective subjects. If there are no appropriate alternatives to study participation, this should be stated. If the study does not involve treatment/intervention, enter "N/A" here.

N/A

d) If the proposed research involves secondary use of data/specimens, check all that apply:

i) coded private information or specimens, and the investigator will not have access to the key.

ii) from publicly available sources.

iii) recorded by the investigator in such a manner that subjects cannot be identified OR any link to identifying information has been destroyed.

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* * * Subject Population * * *

5. Subject Population

Describe proposed subject population, including criteria for study inclusion and exclusion (e.g., age, health status, language, gender, race, ethnicity). State the maximum number of subjects planned for the study. This number should account for all subjects to be recruited, including those who may drop out or be found ineligible.

Subjects located in the US and over the age of 18 are eligible to participate. No minors or subjects located outside of the US will be included in the study. The maximum number of subjects planned for the study is 500 people; we plan to recruit 625 people to obtain this sample size, accounting for a conservative completion rate of 80%. All subjects will be recruited via MTurk.

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* * * Risks * * *

6. Risks and Discomforts

a) **Describe all known risks and discomforts associated with study procedures, whether physical, psychological, economic, or social (e.g., pain, stress, invasion of privacy, breach of confidentiality), noting probability and magnitude of potential harm.**

Risks associated with these study procedures should not be greater than everyday life. Some subjects may experience some possible discomforts related to looking at their computer screen and using the mouse to complete the experiment's tasks, but this discomfort is not more than one would encounter in daily life involving the operation of a computer for a limited duration.

b) **If conducting educational tests, survey procedures, interview procedures, or observation of public behavior, AND linking to subjects' identifying information, explain why inadvertent release of the data would not have detrimental consequences (i.e. place subjects at risk of civil or criminal liability, or cause damage to their financial standing, employability or reputation).**

This experiment does not involve an educational test, survey procedure, interview procedure, or observation of public behavior. No personally identifiable information is collected during this experiment aside from the Turker ID, which is the Mechanical Turk system's unique identifier, and is used to complete and confirm compensation. The experiment system collects data obtained during completion of each interactive task. This data includes task performance metrics such as chosen node path, timestamps, and rewards achieved, none of which is personally identifiable. A randomly generated confirmation code is provided to the subject following the experiment allowing them to insert this code and complete the MTurk HIT, and enabling performance-based compensation only.

In the case of a security incident that released task-related data, during the period when MTurk IDs are still linked to experiment data (prior to confirmation code deletion), it is extremely unlikely that subjects would experience detrimental consequences given the non-sensitive nature of the data collected. The data relates only to the performance on a contrived and abstract path planning task, the exposure of which would not pose any criminal liability nor significant reputational risk to the subject.

c) **In case of international research, describe the expertise you have, or have access to, which prepares you to conduct research in this location and/or with this subject population, including specific qualifications (e.g., relevant coursework, background, experience, and training). Also, explain your knowledge of local community attitudes and cultural norms, and cultural sensitivities necessary to carry out the research. See CPHS Guidelines on Research in an International Setting.**

N/A, this research is only with US subjects

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* * * Procedures to Maintain Confidentiality * * *

7. Confidentiality

NOTE: See CPHS Data Security Policy and CPHS Data Security Matrix before completing this section.

a) Will data be collected anonymously (i.e., no identifying information from subjects will be collected/ recorded that can be linked to the study data)? If no, please list all identifiable and/or coded data elements to be collected. Data is not anonymous if there is a code linking it to personally identifiable information. Also, audio and video recordings are generally not considered anonymous unless distinguishing features can be successfully masked.

The participants' Amazon Turk IDs will be recorded to our project (HIT) on the Mechanical Turk website while the experiment is in progress.

(b) Explain how data, audiotapes, videotapes and photographs, etc. will be secured (e.g., password-protected computer, encrypted files, locked cabinet)stored and who will have access to them. Indicate at what point they will be transcribed and/or destroyed (if ever).

Task performance will be kept within the experiment Google Cloud Platform database, but does not contain any personally identifiable information (e.g. neither subjects' IP addresses, Turker ID, nor any account information are logged or stored). Confirmation codes, which are linked to Turker IDs in Mechanical Turk's system, will be permanently deleted within 2 weeks of subjects' completion of the experiment. We will only export experimental data for analysis after the confirmation codes have been removed. De-identified data will be retained indefinitely on the encrypted Box service provided by Berkeley to allow for possible use in future research done by ourselves or others and participants will be informed of this during the consent process.

MTurk IDs are recorded only within the MTurk database, which contains only the subject-entered confirmation codes allowing us to confirm and complete compensation. This data in MTurk will be retained indefinitely to enable the possible future recruitment of participants who have not yet completed the study. Only listed research personnel on this protocol will be able to access data on MTurk.

Protocol Title: Prospective reasoning in a browser-based experiment
Protocol Type: Soc-Behav-Ed Exempt
Date Submitted: 09/06/2020
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Questions that appear to not have been answered may not have been required for this submission. Please see the system application for more details.

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* * * Attachments * * *

8. Attachments

Add appropriate attachments (e.g. survey instrument(s), interview guide(s), reference list, other IRB approvals, etc.) in this section. Attachments must be in PDF or Word format. Please see eProtocol Attachments Check List for Exempt Applications for more information.

CITI Certificate(s)

Document Type	Document Name
CITI Certificate(s)	Gordon_CITIReport
CITI Certificate(s)	CITI_Group2_Certificate_WDeng

Other

Document Type	Document Name
Other	EPP Screenshots

References

Document Type	Document Name
References	EPP CPHS Bibliography

Document Type CITI Certificate(s)
Document Name Gordon_CITIReport

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Document Name CITI_Group2_Certificate_WDeng

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* * * Assurance * * *

Assurance

As Faculty Sponsor, I understand that I am responsible for overseeing the protection of the rights and welfare of the human subjects, and adherence to CPHS requirements, federal regulations, and state statutes for this human subjects research.

I hereby assure the following:

1. I have read the protocol.
2. I have discussed with the Student/Postdoc Investigator how to comply with his or her assurances.
3. I will be available throughout the course of the study to provide guidance and consultation.

X **I have read and agree to the above assurances.**

As Student/Postdoctoral Investigator, I am responsible for the performance of this study, the protection of the rights and welfare of the human subjects, and strict adherence by all co-investigators and research personnel to CPHS requirements, federal regulations, and state statutes for this human subjects research.

I hereby assure the following:

1. The information provided in this application is accurate to the best of my knowledge.
2. All experiments and procedures involving human subjects will be performed under my supervision or that of another qualified professional listed on this protocol.
3. This protocol covers the human subjects research activities described in the grant proposal(s) (if applicable) supporting this research and any such activities that are not covered have been/will be covered by a CPHS approved protocol.
4. No change in the design, conduct, funding, or personnel of this research will be implemented without prior CPHS/OPHS review and approval.

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5. Participants' complaints or requests for information about the study will be addressed appropriately.

6. I will follow all relevant University of California system and UC Berkeley policies.

7. Should there be any changes that render this study <a class='PH1' href='javascript:getResearchExclusions()'>no longer eligible for exempt review, I will submit a new non-exempt application for CPHS review and approval.

X **I have read and agree to the above assurances.**

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* * * Event History * * *

Event History

Date	Status	View Attachments	Letters
09/08/2020	AMENDMENT 1 FORM APPROVED	Y	Y
09/08/2020	AMENDMENT 1 FORM PANEL MANAGER REVIEW		
09/06/2020	AMENDMENT 1 FORM SUBMITTED	Y	
09/05/2020	AMENDMENT 1 FORM CREATED		
07/06/2020	NEW FORM APPROVED	Y	Y
07/06/2020	NEW FORM SUBMITTED (CYCLE 1)	Y	
06/29/2020	NEW FORM PANEL MANAGER REVIEW		
06/18/2020	NEW FORM PANEL ASSIGNED		
06/18/2020	NEW FORM SUBMITTED	Y	
06/04/2020	NEW FORM CREATED		

PROTOCOL
Soc-Behav-Ed Exempt
Berkeley

Protocol # 2020-06-13361
Date Printed: 09/25/2020

Protocol Title: Prospective reasoning in a browser-based experiment

Protocol Type: Soc-Behav-Ed Exempt

Date Submitted: 09/06/2020

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*** * * Attached Document * * ***

Document Name	Created Date
Gordon_CITIReport.pdf	09/05/2020

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Jeremy Gordon (ID: 6606813)
- **Institution Affiliation:** University of California, Berkeley (ID: 673)
- **Institution Email:** jrgordon@berkeley.edu

- **Curriculum Group:** Human Research
- **Course Learner Group:** Group 1 Biomedical Research Investigators
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 24558455
- **Completion Date:** 13-Sep-2017
- **Expiration Date:** 12-Sep-2022
- **Minimum Passing:** 80
- **Reported Score*:** 96

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	11-Sep-2017	3/3 (100%)
Avoiding Group Harms - International Research Perspectives (ID: 14081)	11-Sep-2017	3/3 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	11-Sep-2017	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	13-Sep-2017	5/5 (100%)
Cultural Competence in Research (ID: 15166)	13-Sep-2017	4/5 (80%)
History and Ethics of Human Subjects Research (ID: 498)	13-Sep-2017	7/7 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	13-Sep-2017	5/5 (100%)
Informed Consent (ID: 3)	13-Sep-2017	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	13-Sep-2017	4/4 (100%)
Records-Based Research (ID: 5)	13-Sep-2017	2/3 (67%)
Genetic Research in Human Populations (ID: 6)	13-Sep-2017	4/5 (80%)
Vulnerable Subjects - Research Involving Prisoners (ID: 8)	13-Sep-2017	4/4 (100%)
Vulnerable Subjects - Research Involving Children (ID: 9)	13-Sep-2017	3/3 (100%)
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	13-Sep-2017	3/3 (100%)
FDA-Regulated Research (ID: 12)	13-Sep-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	13-Sep-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	13-Sep-2017	5/5 (100%)
University of California, Berkeley (ID: 1014)	13-Sep-2017	No Quiz

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kc5665ec5-58f9-4533-b633-f69f3fa2bbe3-24558455

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Jeremy Gordon (ID: 6606813)
- **Institution Affiliation:** University of California, Berkeley (ID: 673)
- **Institution Email:** jrgordon@berkeley.edu

- **Curriculum Group:** Human Research
- **Course Learner Group:** Group 1 Biomedical Research Investigators
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 24558455
- **Report Date:** 13-Sep-2017
- **Current Score**:** 96

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
History and Ethics of Human Subjects Research (ID: 498)	13-Sep-2017	7/7 (100%)
Informed Consent (ID: 3)	13-Sep-2017	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	13-Sep-2017	4/4 (100%)
Records-Based Research (ID: 5)	13-Sep-2017	2/3 (67%)
Genetic Research in Human Populations (ID: 6)	13-Sep-2017	4/5 (80%)
Vulnerable Subjects - Research Involving Prisoners (ID: 8)	13-Sep-2017	4/4 (100%)
Vulnerable Subjects - Research Involving Children (ID: 9)	13-Sep-2017	3/3 (100%)
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	13-Sep-2017	3/3 (100%)
FDA-Regulated Research (ID: 12)	13-Sep-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	13-Sep-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	13-Sep-2017	5/5 (100%)
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	11-Sep-2017	3/3 (100%)
Cultural Competence in Research (ID: 15166)	13-Sep-2017	4/5 (80%)
Avoiding Group Harms - International Research Perspectives (ID: 14081)	11-Sep-2017	3/3 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	13-Sep-2017	5/5 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	11-Sep-2017	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	13-Sep-2017	5/5 (100%)
University of California, Berkeley (ID: 1014)	13-Sep-2017	No Quiz

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kc5665ec5-58f9-4533-b633-f69f3fa2bbe3-24558455

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PROTOCOL
Soc-Behav-Ed Exempt
Berkeley

Protocol # 2020-06-13361
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*** * * Attached Document * * ***

Document Name	Created Date
CITI_Group2_Certificate_WDeng.pdf	09/05/2020

CITI PROGRAM

Completion Date 19-Aug-2020
Expiration Date N/A
Record ID 37796406

This is to certify that:

Wesley Deng

Has completed the following CITI Program course:

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Human Research (Curriculum Group)
Group 2 Social and Behavioral Research Investigators (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

University of California, Berkeley

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w8ef33dc9-11c3-4bb5-8517-83379e339a2f-37796406

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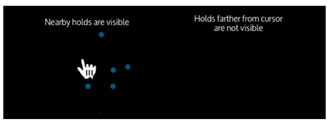
Document Name	Created Date
EPP Screenshots.pdf	09/05/2020

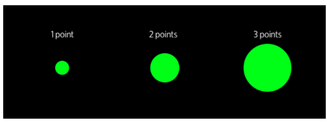
TUTORIAL SCREENS

When ready, press any key to start the experiment.

There are 10 trials. Each will conclude when you reach the goal, or when the countdown gets to 0.

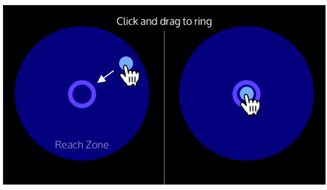
All holds (besides the goal) are only visible when within the spotlight that follows your cursor. Move your cursor to observe the landscape.



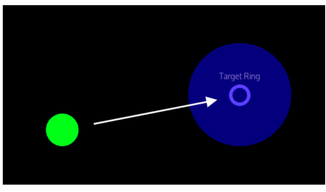


When a hold is dragged, the entire landscape moves with it, allowing you to navigate and eventually reach a goal.

To move, click on any hold (circle) within the larger blue 'reach zone', and drag it to the target ring. You will not be able to grab holds outside the reach zone. If you release the hold outside of the target ring, the map will reset to its previous location.



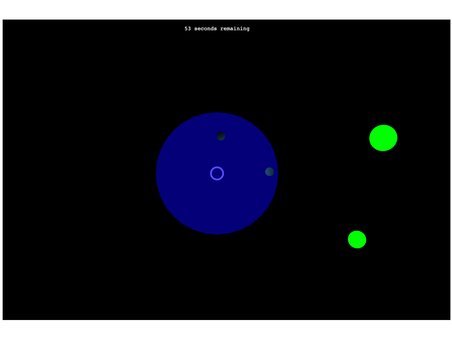
In this experiment, your goal is to move the green goal into the central blue target ring.



Welcome to the experiment. Press any key to move through each instruction.

Trial complete, you received [3] point(s)! The experiment is complete. Total points: 14. Your verification code: **9381661**. You must copy and paste this code into the survey to complete the HIT.

MAIN EXPERIMENT SAMPLE SCREEN



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Document Name	Created Date
EPP CPHS Bibliography.pdf	09/05/2020

Burr, C. D. (2016). *Embodied Decisions and the Predictive Brain*. University of Bristol.

Friston, K., Da Costa, L., Hafner, D., Hesp, C., & Parr, T. (2020). Sophisticated Inference. *ArXiv:2006.04120 [Cs, q-Bio]*. http://arxiv.org/abs/2006.04120

Friston, K., FitzGerald, T., Rigoli, F., Schwartenbeck, P., & Pezzulo, G. (2016). Active Inference: A Process Theory. *Neural Computation*, *29*(1), 1–49. https://doi.org/10.1162/NECO_a_00912

Lepora, N. F., & Pezzulo, G. (2015). Embodied Choice: How Action Influences Perceptual Decision Making. *PLOS Computational Biology*, *11*(4), e1004110. https://doi.org/10.1371/journal.pcbi.1004110

Seth, A. K. (2015). The Cybernetic Bayesian Brain: From Interoceptive Inference to Sensorimotor Contingencies. *Open MIND*. https://doi.org/10.15502/9783958570108