Yang Wang

Link: http://experiments.evullab.org/MOT_exp_2020/MOT.html

The overarching question: During multiple object tracking, do people use motion information while tracking and if they do, what motion information do they use and how do they use it?

This experiment is one of the experiments to address whether people use motion information.

Experiment: It is a design in which motion information is required to track multiple targets correctly above a well-defined chance level (0.5)

3 Conditions:
Position condition: position suffices in tracking.
Velocity condition: position is indistinguishable between target and distractor but opposite velocities of the target and distractor are highly informative for tracking.
Acceleration condition: Both position and velocity are indistinguishable between target and distractor but opposite acceleration of the target and distractor are highly informative for tracking.

Technical aspects:
1. Basic use of HTML and CSS for instruction pages.
2. Canvas and object manipulations and DOM.
3. Server (conceptually and implementation-wise).

Holly Huey

The presented experiment was originally tested with 4-6-year-olds and examined whether children preferentially select informative actions in a causal learning task (Lapidow & Walker, 2019). Children were presented with a novel system composed of 2 gears that operate according to 2 possible causal structures single or multiple causes). In the original study, children were presented with physical stimuli, including an electromagnetic box, gears that do or do not spin on the box, and notecards.

Conceptual Purpose of this Project

1) In the developmental literature, most stimuli are physical objects/agents/systems (or videos thereof). Some developmental researchers have begun to design their studies with animation software or present their studies in virtual environments. However, it remains unclear whether effects seen in the physical domain will replicate in the virtual domain. Thus, this experiment will serve as a *conceptual replication* of the original authors' results in order to demonstrate domain transfer.

2) The original study finds that children are able to identify causal structures by isolating which variable of a system. Specifically, by isolating gears in a novel system, children are able to determine whether: a) a single gear or multiple gears cause the gears to spin; and b) whether a gear is an inhibitive or generative cause of the spinning. Thus, the original study examines how children learn about the causal structure of novel systems based on its content. This paradigm will then be modified using this virtual "Gears Box" to *test how children can learn about causal structure based on the arrangment of its variables*. In other words, perhaps the gears work but are placed in the wrong arrangment on the box—how do children figure this out?

The original stimuli cannot be modified without significant resources, so using a virutal environment allows more flexibility.

3) When learning about causal structures, how do we figure out what variables might be broken? I.e., how do we figure out which variables are inhibitive or generative causes? Further, even if we identify what variables are correct, how do we learn how to properly arrange them? These questions can be reframed in as a "debugging" problem in coding. I've recently begun a collaboration with ThoughtSTEM in which we will *investigate what cognitive mechanisms children may use while learning how to code*. If children are able to make informative actions to determine the causal structure of gears on a box, then perhaps they can learn what actions are most informative for identifying what variables of code are working and non-working due to the variables themselves or their arrangment (e.g., perhaps the variables are correct but the function is wrong). Results would disembiguate whether learning to code is truly a novel skill or whether children can bootstrap their early-developing knowledge about causal structures to solve abstract problems, like coding, based on their exploration of realworld objects/systems.

Technical aspects

I started teaching myself some HTML/CSS/JS in the Fall quarter, so I could begin my 1st-year project on object recognition and causal knowledge. The code for that project is adapted from prior code written in jsPsych. In my 1st-year project, participants draw objects in canvas elements. However, while editing/adding to prior code is instructional, I wanted to write my own code from scratch to test my newly learned skill set.

The "Gear Box Project" was written from scratch. For the most part, the stimuli was created in Blender (3D modeling/animation software) and Photoshop. This experiment does not have a trial list, because the only critical data point to collect is the very last user action of dragging 1 gear off the box. The data that is saved only comprises subject info and a list of locations of where users dropped the gears.

Thus, all in all, this experiment is fairly simple in terms of "trial presentation" (there is only 1 trial) and data collection (there is only 1 data point). So the main technical aspects of this experiment were the flexible presentation of stimuli and CSS formatting.

Accomplished Tech list:
• show/hide images/videos by user clicks and "listening" to when videos finished playing
• create red button in JS, so that it is responsive to user clicks
• click and drag functionality for gears
• cursor hover functionality
• create attributes for the location of gears [1=top-left (on box), 2=top-right(on box), 3=bottom-left(off box), 4=bottom-right(off box)]
• *critically*, show/hide images/videos based on the locations of where users dragged the gears
• *make alert for when users don't put 2 gears on the box in the first familization trial and don't remove 1 gear in the test trial
• record demographic info with radio buttons, drop-down menus, and textarea
• save data to UCSD server
• (and so much CSS formatting)

TODO list:
• *Fix bugs—While I made alerts for when users don't follow the instructions (i.e., don't put 2 gears on the box in the familiarization trial or don't remove 1 gear in the test trial), the function does not prevent the trial from still advancing. Currently, this means that users get stuck between the presentation of videos/images. Any advice would be appreciated!
• Add videos/images of the isolated gear spinning or not spinning, so that users can actually receive feedback on whether the gear they isolated was informative.
• Make the demographic information inputs (gender and DOB) required
• Correct color between videos and images (some are darker/less saturated)
• Correct videos so that the transition between still and moving gears (when the box turns on) is seamless
• Correct CSS formatting which currently doesn't scale properly when a user changes their window size
• Make mobile device friendly—ideally this would be conducted on an iPad
• Host online! This currently runs locally but hopefully will be later hosted on my lab's server

I realize that my code is messier than I'd prefer. If this experiment is actually conducted, I hope to clean my code before continuing to write more content. I think much of my code could be consolidated into wrapper HTML/CSS divs. (I also ran out of time to properly comment my code.)

Yuan Chai

Link to the experiment:

https://psyc241-final-project-yc.glitch.me/

Conceptual purpose

This study tests whether the phonologically neutralized tones in Xiapu Min are perceptually discriminable by the listeners. Xiapu Min is a language spoken in southeast

China (Wen, 2015). There are four tone sandhi rules in Xiapu Min, resulting in tonal neutralization among underlyingly distinctive tones. However, in the production, the neutralization of those tones is not complete phonetically, as indicated by several acoustic parameters (Chai, 2019). This project aims to test whether the acoustic difference remaining in the production among the neutralized tones can be perceived by the listeners.

This project involves two experiments. The first experiment performs a gating task. The stimuli of this experiment are disyllabic words where the first syllable has the same segment and the same tone (after neutralization) while the second syllable has different segments (e.g. /tsa2 tɕi35/ → [tsa44 tɕi35] “magazine” vs. /tsa44 tioŋ35/ → [tsa44 tioŋ35] “audit”). The target words are played incrementally to the listeners in order to determine at what point they can identify the target word. The stimuli of the second experiment are disyllabic words where the second syllable is neutralized while the first is different (e.g. /peu42 pa2/ → [peu55 pa5] “confess” vs. /paŋ42 pa5/ → [paŋ55 pa5] “half-hundred”). In order to test whether the listeners can discriminate the neutralized second syllable, the first syllable is covered by white noise. The listeners listen to the noise-masked word and make a judgment based on the second syllable they hear. If they can still correctly identify the word, it means that the phonologically neutralized second syllables still have perceivable auditory distinction.

Technical aspects

The experiment programming was started from scratch. The procedure for Experiment I is: start the experiment → the stimuli autoplays → the listener selects which word they heard from two options provided → the listener rates how confident they are with their answer on a scale from one to five → 500ms fixation → next trial. The listeners can listen to the stimuli as many times as they want by hitting the “Reply” button. The stimuli consist of three words. Within each word, the word is truncated into three gates. The listeners listen to the first one-third of the word, then two-thirds, finally the entire word. Thus, the order of the presentation is that within each word, the order is fixed (from Gate 1 to Gate 3); between words, the order is random. This is achieved by embedding gate list within the word list. At the beginning of the experiment, the word list is shuffled while the gate list remains in the original order. A distraction trial is presented after each word trial (i.e. after three gate trials). In the distraction trial, five star-shaped items are presented on the screen. One of those five stars are randomly set as blank. The subjects are instructed to click on the blank star to make it filled with blue color. After 500ms, next experiment trial shows up automatically. Experiment II has the same procedure as Experiment II. The difference is that the stimuli were not arranged in gates. The noise-masked stimuli will be played to the listeners as the whole word. The distraction trial occurs every two test trials. The trial lists and the responses will be saved to https://psyc241.ucsd.edu/Turk/data/YC/GatingTask/.

My take-away of the programming process is: 1) it is crucial to turn off the click listener using $(#id).unbind("click"), otherwise the trial number will be updated twice; 2) for Experiment I, in order to preserve the order within the same word trial and randomize the order among different word trials, I need to embed within-word lists within the whole

trial list. Thus, I randomize the higher-level trial list without disrupting the order of gates within the same word.

Chloe Shields

https://psyc241-final.glitch.me/

Conceptual purpose

The Fractal Task is a Pavlovian experiment in which a series of fractal images are associated with the gain or loss of monetary rewards. The experiment shows the stimuli individually, followed by their respective outcomes, requiring the participant to observe and learn the associations. After all stimulus-outcome pairings, the participant's learning is examined with a post-test asking which gain or loss was associated with each image, allowing us to confirm that participants actually learned the task.

Pavlovian tasks like this are useful for examining how cues in our environment can impact our behavior. This topic is particularly relevant to the addiction field, where it has been shown that individuals with drug use disorders have altered responses to drug cues such as craving and relapse behavior. However, altered cue responses seem to extend to non-drug cues as well. I recently found that a history of alcohol dependence strengthened the control of Pavlovian food cues over instrumental behavior. That is, lever pressing during the presentation of a food-predictive cue was energized more strongly in alcohol animals compared to controls. This aligns with similar work in human alcoholics, who also show greater control of non-drug cues over behavior. I therefore designed The Fractal Task to create a non-drug Pavlovian association, which could then be used to examine the impact of Pavlovian cues (the fractals) on instrumental actions.

Technical aspects

As a preface, I came into this class knowing no more about web programming than basic HTML. What's more, I've never even created an experiment for humans before (I've only ever worked with rodents), so the entire process of making this experiment was a new and fun challenge for me. My first task was simply to create divs that would show various images side-by-side with consistent sizing and positioning. The second challenge was to write a series of functions that would present the adjacent images in alternating order, showing a fractal stimulus and then its associated reward/loss with fixation crosses between each trial. I also wanted to randomize trial presentation for each subject while keeping the stimulus and outcome linked together. I therefore created a trial list where image IDs were associated with their respective outcome IDs, randomized the trials using jsPsych, and then pulled sequentially from the trial list to present each image in order for a set duration. Getting the images to display in this correct order took some time and troubleshooting as I thought through the logic of numerous functions, .hides and .shows, and variable intertrial intervals.

The other main technical challenge in creating this task was creating the post-test to

check for participant learning. In the post test, the images are shown one at a time with a drop down menu for answers, and a new image is shown after an answer is submitted. In this case, my main difficulties were in recording participant responses at the correct time, and cycling through the stimuli correctly. This involved realizing that to record participant responses, I only needed one .on("click") statement for the submit button -- I literally spent hours figuring that out (I had multiple in different functions, and everything went haywire) -- and that I needed to 0-index my image names. Overall I'm quite happy with the results of my experiment coding and I'm excited to try more complicated experiment designs!

Mohan Gupta

https://cued-recall.glitch.me/

The goal of the proposed research is to investigate and characterize mechanisms of an effective learning technique: recall, the act of actively retrieving a stored episodic memory. Learning is an everyday process and many instances of learning require repeated exposure. However, some learning methods are more effective than others. Recall training with feedback has consistently been found to produce better learning and retention than non-recall based studying e.g. asking yourself 'when did the United States become a country?' versus viewing 'the United States became a country in 1776'. On the final test, the proportion of correctly recalled items that were trained through recall, minus the proportion of correctly recalled items trained through restudy, is the testing effect (TE). Many factors affect the magnitude of the TE and various models have advanced plausible mechanisms. However, only the Dual Memory Model (DMM) addresses multiple factors and makes quantitative predictions of the magnitude of the TE. While the DMM fits many datasets across multiple laboratories, its many predictions have yet to be rigorously tested across multiple retention intervals, with and without feedback. The DMM makes predictions based on the simple premise that initial studying encodes a study memory and recall strengthens the initial study memory while encoding a new test memory, composed of a cue memory and an associative memory. Together, these memories generalize to enhance recall, creating the TE. While the DMM makes accurate predictions across many factors, it is important to further test its assumptions to understand if it is a cognitively viable model. **How do differing retention intervals and feedback interact to affect the TE?**

Participants will study 80 English word pairs for 8 seconds. There will be three experimental phases over two sessions: an initial study and training phase in session 1, and a final testing phase session 2, where the sessions are separated by a retention interval. Each participant will be randomly assigned a retention interval: 5 minutes, 1, 4, 8, 14, or 28 day(s). Each word pair will be presented for 8 seconds during all phases. During the training phase, studied word pairs will be assigned one of three conditions: restudy, recall with feedback, and recall with no feedback. In the restudy condition, participants will study the original items as they did in the initial the study phase. In the recall with feedback condition, participants will be shown a cue for a word pair and asked to type the associated target word learned in the initial study phase. They will be

presented with the correct response, regardless of answer. The recall with no feedback condition will be same as the recall with feedback condition, without any indication if a correct or incorrect response was given. Each item viewing time will be the same in the three conditions. Up to this point, all conditions have been within-participants. Items seen in the initial study and training phases will be tested. Participants will be shown a cue and have 8 seconds to answer with the associated target word and will receive no feedback.

Technical

To accomplish the above, the experiment was organized in the code as follows: instruction page, phase 1, instruction page 2, phase 2, demographics, debriefing. CSS of the different divs are specified in the top of the document. A challenge of this was getting different sized words to be positioned in a consistent distance away from the '-' separating the target and cue words. There is still an issue when the screen is shrunk, the words are not properly positioned. A potential fix for this is to utilize padding. A Json array of word pairs containing cue and targets, with reaction times to be filled. Each word had to be randomly assigned to one of three conditions for phase 2: restudy, retrieval with no feedback, retrieval with feedback, with a ratio of 2:1:1. To do this, I initialized a vector of 0s, 1s, and 2s with this ratio. I then used jsPsych's randomization to randomize the vector and used a for loop to add it to the json array. I then took this new json array and randomized the order of the word pairs, assigning it to a wordlist_1 for phase 1 and did another randomization, assigning it to wordlist_2 for phase 2.

For phase 1, I made 2 functions: fixation_1 and showTrial_1. The fixation was displayed for 2000ms and then a word pair was shown for 8000ms. The setTimeout functions were used for correct timing. This occurred for 80 trials. Phase 2 was more complicated because there were 3 conditions to account for, 2 that require user input. 5 functions were made: reactionTime, textbox, feedback, fixation_2, and showTrial_2. ReactionTime recorded the reaction time of the last keypress that was typed into the text box displayed using textbox. This was automatically clicked on so the participant could start typing right away. The feedback function was only called if wordList_2[curTrial].retrieval == 2 and displayed the correct target answer to the presented cue. This occurred for 80 trials on the same word pairs in phase 1. During the retrieval trials, reaction time and typed answers are stored. After phase 2, a demographics page is shown and then the participant is lead to the debriefing page.

Phase 3 is functionally the same as the retrieval with no feedback condition in phase 2, where cues are presented and the participant must type the correct target. The challenge of this is randomly assigning a retention interval to a participant and then inviting the correct participant back. Participants are informed there is a followup experiment where they can earn a bonus. Ideally, I would like to setup a server that would automatically message participants their retention interval and then send reminder messages until their retention interval was reached, where a final message would be sent with a link to the phase 3 experiment. I would record their amazon workerID and then the server would automatically send their bonus money. This is the ideal situation and would require several hurtles to be over come.

A simpler method would be to post 6 different experiments, 1 for each retention interval and organize each experiment into different folders. I can then put the worker IDs in a csv and run a simple python script to contact them with their appropriate retention interval and run another python script once I know they've completed their phase 3 to give them their bonus payment.

Kyros Jijia Shen

Many believe that making fillers as similar to the suspect as possible is the best approach to make a lineup. However, we believe making fillers, while matching the descriptions, as dissimilar to the suspect as possible is better. By using face morphing software, we are able to directly manipulate the similarities on a scale and see how subjects perform in eyewitness tasks at different similarity levels.

This experiment is the short version of the future experiment. In the experiment, a face is shown for 2 second, and then a distractor task (a mini game) that lasts for 30 seconds will pop up. After the minigame, the participant will be asked to pick the face they saw from a 6 photo lineup or reject the lineup by selecting "none of the above". In the future, I wish to have 6 lineups in total, shown in randomized orders and assigned to random similarity levels. I will also want the subjects to get half target present and half target absent lineups.

Before taking this class, I had no prior programming experience in javascript or html. Now I am able to code for simple eyewitness experiments (show a photo, then show a lineup).I made this experiment to tackle the randomization issues we've been running into in our lab while using qualtrics. Tech accomplishments: ● Randomize the orders of the lineup photos ● Force responses ● Upload data to the server To-do in the future: ● More trials in randomized order ● Randomize target present/absent ● Randomize similarity levels

Dalin Guo

Exploration and exploitation trade-off is commonly studied in psychology and neuroscience using a multi-armed bandit (MAB) paradigm. In MAB, participants repeatedly choose between options and only receive rewards and feedback on the option they chose, not the other unchosen options. Thus, each choice yields not just reward gain, but also information gain. It's been an open question on what factors driven human exploration decisions, and whether people use directed exploration, that they deterministic explore an option, or random exploration, that the exploration is more or less a result of decision noise. The process of making a decision in a MAB can be separated into two parts: learning rule and decision policy. The learning rule incorporates past decisions and observations and outputs the statistics about the options, e.g. the estimated reward rates and estimation uncertainty about the reward rate estimation. Different learning rules might make different predictions. Decision policy makes choice based on the output from the learning rule, e.g. always choosing the option with a higher estimated reward rate (maximizing) or allocate choice between options proportional to the estimated reward rates (matching).

A previous study has shown that matching behavior of humans and animals can be generated by an incorrect learning rule with maximizing decision policy (Yu and Huang, 2014). As learning and decision making are interacting with each other, in MAB and other tasks in general, one can not confidently make claim about the decision policy with a wrong learning rule. Here, we use a passive bandit experiment, in which participants can observe the outcomes of all options, not just the chosen option, removing the “active” exploration aspect of MAB. In this scenario, there is no reason to assume subjects not choosing the option that they believe it’s most rewarding (maximizing). This experiment manipulation can serve to identify the learning rule adopted by human subjects. The subjects are also asked to report their estimated reward rates and their confidence level about their estimate during the task. This self-report will also be used to validate the learning model. In the end, we collect subjects’ psychiatric measurement, as it is commonly observed that depressive or anxious populations have a deficit decision-making process.

I implemented the passive bandit experiment using the jspsych library. Jspsych provides a nice way to modulate the code and is beginner-friendly. I never code any experiment before this class, but have used Matlab to analyze and model behavioral data. I have some limited experience with HTML/CSS/Javascript from a TAship of an intro-level CogSci class. I found it hard to code the actual bandit task with jspsych, as the feedback will need to be depended on the user keyboard input, so I only implemented the passive bandit so far.

The choice trials are coded as a “categorize-html” trial. There are three possible outcomes in my experiment, corresponding to a reward in one of the three cards. Those three possible outcomes are coded as three “timeline_variables” with different “key_answer”, “correct_text”, “incorrect_text”. The “correct_text” and “incorrect_text” are always the same, displaying the outcomes of all three cards. I used a “with-replacement” and weighted sampling to randomize the order of those three possible outcomes, and the number of trials before a self-report query is also uniformly sampled from 8-12. After 8-12 trials, I used another “categorize-html” trial to ask the subjects to report their estimated reward rate on one of the card, which is randomly selected from three cards by “with-replacement” between three different “stimulus”. After reporting their estimated reward rate, an “html-slider-response” trial shows up and asks them to indicate their confidence level about their previous answer. Then, they go back to the choice trials and resume the task. After finishing the experiment, a “survey-likert” trial shows up to ask about their depression and anxiety level by a four-question questionnaire.

Angus Chapman

This is an experiment designed to test how people can make perceptual judgments about multiple features simultaneously. On each trial, participants see two pairs of rectangles, which are presented in different colors and at different orientations, and they must judge which pair of stimuli are most different from each other. The two features,

color and orientation, are manipulated so that pairs differ by specific amounts (color: 0°, 10°, 20°, 30°, 45°, 60°, 90°, 180°; orientation: 0°, 10°, 20°, 30°, 45°, 60°, 90°).

As the difference between orientations and colors increases, we would expect participants to select that pair of stimuli as being most different, and can quantify how much each feature contributes to this decision by using established psychophysical models. The difficulty with the task is that there's often not an objectively correct answer – if the orientation difference is greater on the top, but the color difference is greater on the bottom, it depends on what feature you weigh more heavily.

Before this class, I had limited experience with HTML and CSS (basically editing pre-existing website code to personalize it for my use) and no experience with Javascript. I have used python a decent amount, so the object-oriented aspect of Javascript wasn't too difficult, although some of the peculiarities of the language were a trouble at times – I had to find a script online to enable me to randomly shuffle arrays so that I could select my stimuli on each trial, for example, something that's packaged into languages I use more frequently.

Setting up the experiment stimuli wasn't too difficult, although I made a lot of additions to the basic code for experimental design reasons. For example, once the color and orientation difference of the two pairs is established, I randomly assign the pairs to the top or the bottom of the screen, then randomize which stimulus appears on the left or the right of the display, because initially the four stimuli would be rotated clockwise from one another in a consistent pattern (and similar for color, although "clockwise" is not as directly interpretable). Dealing with the circular feature spaces was tricky at times, because the data can save out a color difference of 30° or 330° (which are the same). This is fixable, but I've opted to do it on the analysis end where I find it a little more straightforward. Javascript is fine, and I can figure it out when I need to, but it feels like I'm having to take the long way to get some things done compared to python/matlab.

Catherine Tallman

https://glitch.com/~tallman-final

Aphantasia is a congenital condition in which individuals lack a "mind's-eye." This phenomenon occurs in approximately 2-3% of the population (Faw 2009) and these individuals are unable to voluntarily visualize or re-experience sensory components of previously shown objects (Zeman, Dewar, & Della Sala, 2015). In recent years, this condition resurfaced as a budding area of research after a patient (MX) underwent heart surgery and self-reported he had lost his ability to visualize post-op. Despite self-reported deficits in visualization, patient MX performed similarly to controls on visual memory and mental imagery behavioral tasks (Zeman 2010). Lacking the inability to visualize, most aphants are seemingly able to go about their daily lives relatively unimpaired, possibly never knowing their inability to visualize is an anomaly. Some suffer from Severe Deficient Auto-Biographical Memory and/or Prosopagnosia, although

it is unclear whether there is impaired daily cognitive functioning in this group as a whole (Zeman et. al 2015).

Only one such study (n=1) concluded that the individual AI with aphantasia had poor performance on only the most difficult trials of visual working memory task (Jacobs et. al 2018). Subjects were presented a target shape, and after a short delay, were asked to report if a subsequently presented dot would be contained within the shape. Difficulty was varied by how close the dot probe was to the boundary of the shape. The task was then modified into a mental imagery task by asking subjects to visualize the shape rather than presenting the shape (Fig 1). Surprisingly, performance on the mental imagery task did not differ, although AI performed worse on difficult visual memory trials. This suggests there may be a compensatory strategy occurring during visual or spatial memory tasks. I believe that mental imagery and visualization tasks, including the task created in Figure 1, provide a sensory cue that allows for aphants to perform as well as controls through a compensatory mechanism. I propose to administer the Vividness of Visual Imagery Questionnaire (VIVIQ), the possible/impossible shape task, and the Hooper Visualization Organization Test (HVOT) on both aphants and matched controls. It is expected that aphants will perform similarly to controls on the possible/impossible task as a full sensory cue is given, while they will perform worse than controls on the HVOT since they are required to visually assemble an image.

I assembled my first web-experiment utilizing JsPsych. Using the PSYC241 server, I hosted the stimuli images in the Catherine/imp_pos and Catherine/hvot folders. Before beginning the experiment, the user is prompted that the display will maximize to fullscreen, and the esc key will minimize the screen. Two instruction pages were constructed to orient the subject to the three phases of the experiment. A navigation button allowed the subject to proceed while backwards navigation was disabled. The first phase of the experiment is a categorization task of impossible/possible objects where the keyboard was restricted to only listen to the “a” and “k” response buttons with “image-keyboard-response”. Before the task, the subject was presented four practice trials with feedback to orient them to the task using “categorize-image”. After another instruction page, a fixation variable with a jitter (randomized and sampled without replacement) and a stimulus variable were constructed; they were subsequently presented within a procedure in a random order. Using “html-keyboard-response”, key presses within the fixation period were ignored.

The second phase of the experiment, the VIVIQ questionnaire, was introduced with another set of instructions with a forward navigation button. The questions were presented using “survey-multi-choice” with a preamble and each question required an answer to proceed. The HVOT then began with an instructions page followed by the serial presentation of all 30 stimuli using a for loop (the test administration does not call for randomization). The “survey-text” plugin was modified to source image files as the stimulus rather than text. Below the picture, subjects are prompted with the preamble, “What is this object?”, followed by a text box. In the final section of the experiment, “survey-multi-choice” was used to collect demographic information. A random mTURK code was generated and used as the subject ID number. This subject ID number was presented to the subjects on a final instructions page that indicated that this would be

the code they enter into Amazon, therefore I can match the subject ID to each submission. All data are saved to PSYC241 server Turk/cwt_test/aphantasia.

Monica Gonugunta

Link to project: https://glitch.com/~monica-psyc-241

Conceptual Purpose of the Project:
I decided to perform some market research through more of a survey format. I'm a freelance graphic designer under the brand name austenrose designs, and I've been trying to decide on a brand bio and color scheme for my website. To gather the data that would inform my decision, I developed a survey with 3 sets of trials, not including demographics. The first set of trials was a *word association* task where participants were shown a word and asked to type in the first word or phrase that came to mind. I wanted to see whether certain words currently on my site evoked similar trains of thought in other people.

Next, I included a set of *color alteration* questions where participants were given a color swatch and instructed to use 3 sliders to adjust the shade until it met their personal preferences. Leaning even further into the concept of color, my final set of *color rating* questions showed participants two color swatches and asked them to choose their preferred swatch. Each swatch was associated with a different well-known brand. For example, one trial had the blue from the Facebook logo and the blue from the Twitter logo. To finish the survey up, I added a couple of questions about social media usage and demographics. I'm not sure if these will provide any useful or valuable insight, but it was fun (albeit challenging) to code.

Technical Aspects of what I Accomplished:
To start off, I created a separate div for the instructions, "continue" buttons, and inputs of each set of trials. For each set of trials, I created an array with the relevant stimuli for each trial. For the *word association* trials, the stimuli were words; for the *color alteration* trials, the stimuli were rgb values and shade names; for the *color rating* trials, the stimuli were hex color codes and brand names (for scoring purposes). I used a jsPsych.randomization function to shuffle the arrays for *word association* and *color rating*. I tried it with the *color alteration* trials but it overloaded the console, so I removed it. Then, I wrote a function that would call each element by its index, one at a time, along with an input div and a button div to proceed to the next trial. Once the array values were exhausted, the script would call a function to display the instructions for the next set of trials. After the 3 sets, a function would call the demographics div containing demographics questions and an "end experiment" button. Clicking that button would show an endscreen with a thank you message.

The *word association* trials were the most straightforward to code, but I spent several hours attempting to code a set of 3 sliders that would update a color swatch (for *color alteration*), but I couldn't get it to work. I eventually found a bit of code that did exactly that on GitHub, and put that code into my looping function and modified it to fit my formatting. One issue I'm still having is that the sliders themselves are colored red,

green, and blue, but only for the first trial of the set. I also need to figure out how to center the sliders and swatch on the page to match the rest of my formatting, or change the other divs to align left. For the *color rating* swatches that would be displayed, I modified the coding from the *alteration* trials and removed the sliders, so that the formatting would be consistent. I then added radio buttons under each swatch for participants to click. I haven't added any saving generated data because I'm still trying to work out the formatting of the trials. I've coded some basic things in Java and R before, and this HTML/CSS/JavaScript course was still a bit more challenging than I expected, but I think that's a good thing. This project still has a long way to go for me to be completely happy with it, but it's still pretty rewarding to see how much my skills have improved over the quarter.

Anne Yilmaz

https://showup-lineup.glitch.me/

I wanted to create a showup lineup condition. We have preexisting code for my first-year project written by our former programmers. We want to tweak that experiment in order to add a showup condition to it (we have the code for the rate-them-all and standard simultaneous lineup). Since it's written in JS and HTML, I chose to write in that instead of attempting JSPsyc or something like that.

I've never used any CSS before and had some issues with images/videos breaking through their containers and the text being overlaid weirdly. That took me a little longer to figure out. The function in which the pictures appear randomly and then update the ID of the placeholder picture, that was probably the toughest part. I spent multiple days trying to create a function that would read the new picture ID in order to save whether a TA or TP lineup was issued to the participant. (You can peruse the old files under index to look at old versions of that function.) Eventually, I did something sort of hacky and had the img src save directly to the server instead of the value of some variable. I've also never done ANYTHING involving a server, so that was a challenge.

So Eun Ahn

https://psyc241.ucsd.edu/Soeun/Objects/Final%20project.html

The motivation for the study is based on the idea that people are more likely to produce or re-use a sentence structure they have heard before, which is called structural priming. Bock (1986) used a paradigm in which participants were read sentences in either the active (e.g. "one of the fans punched the referee") or passive structure (e.g. "the referee was punched by one of the fans") and were then asked to describe pictures that could be described with either an active or a passive sentence (e.g. "lightning is striking the church" or "the church is being struck by lightning"). She found that participants more often described pictures in the passive structure following passive primes. The priming of passive structure constitutes a compelling case of structural priming because later studies have found that less preferred structures tend to exhibit greater structural priming than a neutral baseline (i.e. a simple transitive

sentence like “the man is running”) as compared to conventionally preferred structures (e.g. the active structure) that exhibit smaller priming effects (Ferreira & Bock, 2006).

Because it is also the case that the structural priming effect is magnified when content words are repeated from prime to test – this is called the lexical boost effect, the aim of the current experiment is to test whether it is the lexical component that is driving the structural priming effect (Pickering & Ferreira, 2008). Perek & Goldberg (2017) tested the hypothesis that the functions of constructions rather than the meanings of individual words – particularly, the verb – guide language learning and use and that speakers are sensitive to both the distribution of constructions (i.e. the number and proportion of occurrences) and the contexts in which particular constructions are used. They used a paradigm in which participants watched videos of two characters performing transitive actions (e.g. a bear punching a rabbit) that were either “strong” (e.g. the rabbit is thrust backwards) or “weak” (e.g. the rabbit is hardly affected). Participants read descriptions of these videos that contained pseudowords, some of which were only used to describe “strong” actions, others were used to describe only “weak” actions and still others were used to describe both actions. Participants were instructed to repeat the prime sentences and to describe new videos using the pseudowords that appeared in the prime sentences. Given this evidence that speakers pay attention to and learn the functions of constructions, the purpose of the current experiment is to test whether the verb-construction associations will reduce or even nullify the generally strong priming of passive structure by using prime sentences in the passive structure with novel verbs that are either used exclusively in the active or passive structure.

The experiment design is as follows: participants will hear one-sentence audio descriptions and then watch a short clip showing an action that has just been described. On the following trial, they are shown another clip of an action being performed and then are asked to describe what they just saw by typing in responses (they will be given a pseudo-verb to be used on each production/test trial; all pseudo-verbs – verbs that were exclusively used in the active structure and those that were used in the passive structure – will be given on the test/production trials). This series of trials will be repeated for a total of 100 critical prime trials and another 100 production/test trials in the same alternating order. Half of the prime audio descriptions will be in the active structure using half of the full set of pseudowords. The other half of the prime audio descriptions will be in the passive structure using the other half of pseudowords. Filler prime trials will have simple transitive sentences with video clips showing a simple transitive action (e.g. running). Although Perek & Goldberg (2017) used written descriptions, the current experiment will use audio descriptions, as the standard structural priming paradigm – as in Bock (1986) – uses audio descriptions. The pseudo-verbs used in the prime audio descriptions will be a subset of pseudowords used in Perek & Goldberg (2017). In implementing online the standard structural priming paradigm, which involved an experimenter reading aloud the prime sentences to the participant, I will make recordings of a native English speaker reading the prime sentences and select video clips from a dataset of videos showing transitive actions being performed. The audio descriptions will be played prior to showing the videos. While it would be ideal to collect audio responses from participants as in Bock (1986)

and Perek & Goldberg (2017), typed responses will be collected using a prompt and survey format following the test video clips due to IRB issues.

The demo experiment to be presented in class shows three sets of sample trials: two sets of critical prime and test trials (both in the passive structure) and a set of filler prime and test trials (the filler test video clip should also show a simple transitive action e.g. eating instead of handing an object; it will be eventually replaced once I find another dataset without a pay wall). I used jsPsych to code this experiment because my goal was to learn to use a programming language to replace designing and running experiments on PsychoPy, which is widely used for behavioral experiments (and also because I have almost no prior experience with programming apart from R). Because jsPsych already provides a variety of Plugins for different types of experiments, I imported all the Plugins I needed for my experiment – "jspsych-html-keyboard-response," "jspsych-audio-keyboard-response," "jspsych-video-keyboard-response," and "jspsych-survey-text." Then I coded the specific features to be used in each Plugin (e.g. for "video-keyboard-response," I specified the size of the video clip to be displayed on screen). I used the same "saveData" function we coded in class for my own experiment. The Plugins and the "saveData" function are all enclosed in a for-loop so that they will be run in sequential order. Given more time, I would have liked to explore programming custom code to sync the audio and video and program the entire experiment using jQuery alone but I believe that what I have is a good starting point.

Jonathan Keefe

Here is a link to my experiment: https://psyc241.ucsd.edu/Jonathan/Final%20Project.html.

There is a growing body of literature suggesting that long-term memory can be recruited online during the performance of working memory tasks, allowing subjects to seemingly forgo the active maintenance of information in working memory. This seems particularly adaptive given the limits of working memory and the wealth of information that we have about objects that we see in our every day life. In other words, this strategy may allow humans to use previously stored information about a stimulus to overcome bottlenecks in cognition.

One particularly striking bottleneck in cognitive psychology literature is the attentional blink, which is a decrement in the ability to report the second of two masked targets when presented in rapid succession. Popular models of the attentional blink conceptualize the phenomenon as resulting from a limitation in the ability to encode fragile perceptual representations of stimuli into working memory. Consequently, the present project is seeking test whether the attentional blink can be alleviated when one of the targets is already in long-term memory. This will be tested by having subjects encode stimuli into long-term memory and then having them perform an attentional blink RSVP paradigm in which targets are sometimes present in long-term memory (and sometimes not). If subjects can recruit long-term memory representations online in

order to overcome the bottleneck at encoding in the attentional blink, then it would be expected that the attentional blink is of lesser magnitude when one of the targets has already been encountered.

There are two parts to the code that I have written, corresponding to the two tasks that subjects perform. In the first part, there is a serial presentation of real-world objects to store in long-term memory (i.e., LTM); and in the second part, there is an attentional blink (i.e., AB) paradigm. Subjects perform 16 trials of each task per block, and there are currently two blocks. In order to effectively block and counterbalance presentations, I use the jsPsych factorial function and pull the number of images needed to perform two blocks (64 images). Half of these images are randomly assigned to be shown in the LTM task and the other half are saved to be “new” images in the AB task. This process is performed separately for each subject. Images are then pre-loaded and the trial structure then begins, looping through the appropriate number of LTM images and then continuing to loop through the same number of AB trials. In the AB task, subjects see either an “old” or “new” object as T1 and then a tilted gabor (45 or -45 degrees) at a lag of either 300 or 800 ms. At the end of each trial, they are asked to report which of two objects they saw in the trial (the presented image and another “old”/“new” foil) as well as which direction the gabor was turned, using the “m” and ”n” keys. All of this is accomplished in the javascript portion of the code.

The presentation infrastructure is of course set up in the HTML and CSS elements. There are separate divs for each of the screens that subjects will see. For example, there is trialDiv for all image presentations, T1Response for the response as to which of the two objects they saw on each trial, etc. Each of these divs is centered in the screen and hidden until prompted to show in the appropriate javascript function. All divs are capped at 500px in width. Images are pulled from my folder on the Psych 241 server, where the code is also stored. At the end of the experiment, the information about the LTM and AB trials is sent ahead to the Turk folder of the server. I should note that I plan on adding a short LTM test at the end of each block, but did not have time to implement this change.

Leo Kleiman

Conceptual background:

I’m interested in the robustness of default effects as situational variables change. For some background: Löfgren et al. (2011) suggest that default effects attenuate for domain experts, though they only have experts in their sample, making causality hard to establish. In contrast, Vetter and Kutner (2016) find that attitude strength does not attenuate default effects (though they merely measure but do not manipulate attitude strength). These studies suggest an interesting relationship in which attitude strength alone cannot reduce default effects, but actual expertise may (this seems to have precarious implications for the claims of libertarian paternalism). Fleming et al. (2010) shows that as decision complexity increases (in their case, increasingly difficult spatial decisions), participants are more likely to accept the default.

In this experiment, I'm exploring how acceptance of defaults varies as a function of perceived importance and completeness/availability of situational information. I'm using a 2x2 interaction in which decision stakes are manipulated (high v low reward value as a proxy for importance), and information revealed regarding potential rewards from a die roll is manipulated as well. I'm using this "revealed information" variable as a sort of proxy for expertise, as anything resembling manipulation of expertise would require a seriously more complex experimental design. Some predictions: It seems that each of the most commonly reported three putative mechanisms of defaults (reduction of effort, endorsement by default setter, reference point/status quo) makes predictions about various interactions. The reduction of effort account suggests that more people will stay with the default in the low value conditions, and are more likely to switch to the objectively better die roll in the high value conditions, as opting out of an inferior default will be more likely to be worth the additional effort. By contrast, the endorsement mechanism suggests participants will be more likely to accept the default in low info conditions. Finally, the reference point mechanism also suggests high acceptance of defaults in low info conditions, as "losses" are more likely to be felt when choosing between the ambiguous rewards than an objectively better comparison. Overall, I'm expecting some combination of all three mechanisms, leading to default acceptance from highest to lowest in the following order: (1) Low info & low rewards, (2) low info high rewards, (3) high info low rewards, (4) high info high rewards. (I think low info high reward and high info low reward will be very close, unlikely to be sig different.)

Technical background:

I'll preface by saying I have no html/css/javascript background at all, in order to set the bar as low as possible (which is to say, the major technical feat is getting literally anything to function) ☺

In this experiment, I created four trials in divs that were sourced from images of potential die rolls (images hosted on the PSYC 241 server). Each trial has a radio button below it, in which Die Roll 1 is preselected (the default). Once respondents have either accepted the default or opted for Die Roll 2, they can press the next button, which moves along to the next div. The div order is constructed via a loop that generates a current trial that starts at one, and then increments by one each time the "next" button on any given trial is clicked. Once the loop has reached the max number of trials, it hides the trials and displays the demographic data div. When the demographic data "complete" button is selected, the script runs with DoneWithExperiment function, which creates a variable that is a combination of a randomly generated subject ID, the selected dice rolls from the trials, and the demographic data. This variable is then sent to the class server in a JSON format.

I'd like to, ideally, randomly generate the die rolls from selected ranges of values such that enough trials were presented to estimate exactly how large magnitude and informational differences have to be before the default is reliably opted out of (in the current design, it's always inferior). This will be my next step.

Xiaotong (Tone) Xu

Existing design research has investigated extensively how examples may help people generate more creative designs. Marsh et al. (1996) found that people's ideas will conform to examples. Kulkarni et al. (2011) found that people who were exposed to examples at early stages of design produced more uncommon features. Yu & Nickerson (2011) found that continuously combining designs also yielded more uncommon features. On the other hand, examples may constrain people's designs that Sio et al. (2015)'s analysis showed that examples actually constrained the diversity of ideas. With both potential benefits and harms, how might we sample inspirations from distributions of examples that can result in designs of maximized value?

To understand the above question, we propose a study that examines how people leverage or combine sample ideas to create their design. Participants are asked to sketch a creative chair design with exposure to 2 examples at the same time. The study would be a within-subject study that each participant goes through 8 trials. For each trial, the current project shows participants a pair of image stimuli on the top of screens and asks participants to generate a creative sketch below that combines each of the stimuli. Participants are exposed to 2 trials for each of 4 conditions: (a) a typical chair + a typical chair, (b) a typical chair + an atypical chair, © a typical chair + a typical desk, a typical chair + an atypical desk.

The technical aspect of this project includes both front-end and back-end work. Node.js and jsPsych were heavily used. The current project is modified from Professor Judy Fan's "drawbase" template, where I built on an empty cue box and a canvas. I did most work in CSS and Javascript (nothing much going on in HTML file) that most changes were made for jspsych.css, jspsych-cued-drawing.js, and setup.js. The styling of the web app was intentionally optimized for iPad so people can use Apple Pencil to draw.

More implicit technical details include randomly selecting the example from a pool of same-category stimuli (to assure the external validity), randomizing the order of (within-subject) conditions (to counterbalance the order effect) and the position of each type of image (the typical chair image can appear on either left or right). The console.log would print out stimuli categories as well as other data that is sent to the lab server. Participants' work is saved as SVG traces using canvas and will be used for further analysis.

Jamal Williams

https://bradylab.ucsd.edu/turk/experiments/Jamal/JS_wmEnsembles/

This project investigates the relationship between working memory and ensemble perception. It's likely that the reader has some knowledge on this topic so I guess I'll forgo a lengthy introduction. Some suggest that ensemble processing doesn't require attentional or other cognitive resources while others suggest that they are reliant on WM. Here, I modify the veridical set size and the perceived set size of a series of dots to experimentally manipulate the working memory load necessary to compute the mean of these dots.

Participants see either heterogenous displays where every dot is unique—with set size 4, 6, and 12—or homogeneous displays where dots repeat: at set size 6 there are either 2 or 3 repeated sizes, and at set size 12 there are 2, 3, or 4 repeated items. There are 24 unique displays—three each per condition— and participants see these displays for 1.5s, prior to a 1s delay (taken from Brady et al., 2011). After the delay, participants are presented with a dot that changes sizes continuously in response to a range slider. I predict that if ensembles require working memory, then performance will suffer when the number of items needed to compute an accurate mean exceeds working memory capacity (ABOUT FOUR ITEMS).

Technically, the coding for this project is relatively straightforward. However, the challenge I set out for myself was to code the bulk of the script without relying on previous scripts for any scaffolding—a couple functions were copied from previous scripts to facilitate data collection (e.g., SaveData).

Prior to class starting I was able to modify web programming scripts but failed to understand what was happening in a concrete way. Now I feel a little more confident coding in javascript, and using imported functions from other libraries (e.g., TimTools, jspsych). I implemented a couple things that were novel to me: preloading images instead of adding extra long delays to load them in the background, and using a javascript range slider to capture continuous response data. Stimuli were generated in MATLAB and presented as images by javascript. I wanted to have JavaScript deal with stimulus generation and presentation but after a few hours it seemed unnecessarily complicated and would lack a level of control over the stimuli that MATLAB provided.

Yaqian Huang

https://iced-dumpling.glitch.me/pdperception.html

Period doubling is a type of acoustic signal where two regular pitches are detected instead of a single pitch. The fundamental frequency with higher amplitude co-exists with another fundamental frequency with smaller amplitude. This type of signal is often found in natural speech and occur regularly in Mandarin Chinese. It was found that period doubling often results in a rough-sounding quality.

It remains unclear if listeners can hear both pitches or one out of the two possibilities or neither, that is, a rough voice. This experiment thus aims to test the perception of pitch in signals with period doubling. For example, 43 Hz and 109 Hz both exist in a sustained utterance. It is possible that listeners hear the lower fundamental frequency at 43 Hz or the higher 109 Hz, or both frequencies, or neither. The stimuli are sounds with period-doubled harmonics and the task is to compare the percept of these harmonics with two referencing complex tones with two different pitches that theoretically co-exist in the period-doubled signal.

Technical aspects accomplished:

The experiment uses HTML, CSS, and jQuery to code the procedures. JsPsych was also used to randomize the test trials. I only had experience with IbexFarm before I

started the class, so there are basically three challenges that I used more thinking to tackle.

First, to include the test audios and two reference tones as the experiment trials which can be played multiple times, I used audio tags and created three buttons. Second, in order to force the participants to choose from one of the four options before continuing, I used radio buttons and implemented some conditions to allow the trials to proceed to the next one only if the subjects had chosen one option. Third, to set up the practice trials, I used the HTML DOM innerHTML properties to change one button in the practice trials and trigger different functions to start the real experiment.

Hayden Schill

https://bradylab.ucsd.edu/turk/experiments/Hayden/training/calcTraining.html

Conceptual purpose of the project:

A few months ago, I ran an experiment looking at whether and how Visual Hindsight Bias influences expert populations. Expert radiologists are a great 'model system' to answer this question because the nature of their task calls for a particular kind of perceptual expertise. Specifically, we looked at whether radiologists exhibit Hindsight Bias for the two main kinds of abnormalities present in mammograms, masses and calcifications, which differ mainly by their perceptual features – masses are larger and have low contrast, calcifications are smaller and have high contrast compared to the surrounding parenchyma.

The next step in the project is to run the same experiment on a control group of novices. Therefore, the goal of the current web development project was to design a training session that novices could complete before doing the actual experiment. The goal of the training session is to introduce them to the features of masses and calcifications, so that they might be able to complete the task used on radiologists.

Technical aspects of what I accomplished

For context, I had very little programming experience in JavaScript prior to the class. One thing that I enjoyed figuring out in this project was how to direct people to different html scripts. I chose to write the training session in various chunks or scripts, both to keep the scripts clear and concise (not to have one long script), as well as to practice going between scripts. This also worked well because of the nature of a training session: if the participant wanted to go back and review examples, there is an option to do so & it was easy to direct them back to that specific script; if the participant fails the training test before the main experiment, it will redirect them to another script to start over from the beginning. I also worked on preloading images, using the console to solve (or at least recognize) different problems that arise, scaling images, and providing feedback depending on how the participant responds on a trial-by-trial basis. I know that for all programming I did, there was probably a more efficient and elegant way to accomplish the same thing – and I look forward to learning these various ways to improve the code!

During the class, I also designed my own website, which was super fun. All-in-all, I feel much more equipped to write my own web-based experiments and am excited to continue getting better at this skill and to continue using it as a resource in the future!

Sherry Yueyi Jiang

The conceptual purpose of the project is to create a framework in which participants can choose from two alternative options with one certain option and one probabilistic option. The sequence is as follows. First, there will be an introductory page which will display a brief description of the game/task. Next, there will be a detailed description of the game/task with important information marked in red or bolded. Once participants click the “start the game” button, they will answer some comprehension check questions. After this, participants will start the actual task. During the task, they will choose one of the two options on each trial and the current/total trial will display on the top. On the bottom, there is a description button. This allows participants to revisit the description (same as in the description page earlier) if there is a need. Finally, there are a few questionnaires and self-reported demographic questions including IRI, NFU, MFQ, gender, sexual orientation, student ID, political preference, and one open-ended question asking about participants’ strategy when making decisions.

The framework of this project can be extended to other types of decision tasks, especially when at least one of the options is probabilistic. It is flexible in building a range of different experiments: 1) decision task design 2) learning task 3) questionnaires with sliders or open-ended questions, and many more. It is also flexible in running on different platforms including MTurk and SONA (example code snippets inside) and compatible to different versions (e.g., gains versus losses).

There are several technical aspects of I have accomplished throughout the course and this project:

1. Learning the basics of React from tutorials and studying example codes
2. Using different packages supported by React and Javascript, including fade-in and fade-out animations, progress sliders, and styling methods.
3. Learning the basics about how to create questionnaires and demographic surveys
4. Better understanding of Javascript and css as well as the logics of programming

This experiment is adapted from several experiments (built on React) on related topics, including a face learning task and a moral decision task. Before taking this class, it was challenging for me to understand the logics and to adapt it. During this project, I improved the UI design and adapted to decision-making tasks related to monetary gambling (which is conceptually similar to an experiment running in our lab).

Ana Chkhaidze and Parla Buyruk

https://cognation.ucsd.edu/experiments/

One way that languages differ is how they encode the nature of events. More specifically, whether such events are accidents or intentional. While a librarian wouldn't be confused if one were to say "I lost the book" in English, this construction would be inappropriate in Spanish. That is unless you intended to lose the book and succeeded, you would not say it that way. Instead, you would say something equivalent to "It happened to me that the book lost (itself)". If this difference reflects how speakers of English and Spanish habitually express accidents reliably, it could have implications in how these speakers reason about these events.

Previously it's been shown that Spanish, English and Japanese speakers reliably use different constructions when they describe accidental and intentional actions against objects (Fausey and Borodisty, 2011). Replicating previous work (Spanish, English, Japanese) and extending the set of languages to (Turkish, Georgian, Marathi) will help us identify and describe the syntactic properties that result in such differences and more importantly allow us to make fine-grained predictions for how these differences might reflect/result in psychological differences about intentionality.

For the purposes of this class, we kept the language of the experiment in English. In this experiment, participants watch a series of short videos containing intentional and accidental actions and they are asked to provide one-sentence descriptions to these videos. The task is followed by a demographic questionnaire that includes a detailed history of the participant's language background. We started the class as complete novices to HTML, CSS, and JavaScript. Ana has coded experiments in MatLAB in the past and Parla has been using Qualtrics for her studies and had some MatLAB programming experience. Though our experiment is a simple elicitation task, while coding it we practiced using all kinds of different input formats. For example, participants use a text-area to enter their descriptions. In the demographics and language history survey, age is restricted to number keys only (and the letter 'e', because it is a number), gender has radio-buttons, location has a drop-down menu containing all countries in the world. Participants are asked to enter different information regarding each language they speak, so we formatted input-boxes into columns and added code so that they are allowed to add more rows for each additional language. We experimented with using different libraries (e.g. there is confetti at the end of our experiment). We are now able to save the participant data in JSON format and save it to our lab server.

Our particular experiment has two conditions. We created these conditions as separate html files. To randomly assign participants to each condition, we used Qualtrics survey flow. We used a 'Randomizer' element that led to two different 'End of Survey' elements. We customized each of these by using the 'Redirect to URL' option to link to our respective conditions. Using Qualtrics has many benefits: 1. We are able to set counts for how many participants we want in each condition, 2. Having one link for the entire experiment facilitates distributing the survey (e.g. posting on SONA). 3. This method can be scaled for surveys that contain a higher number of conditions.

Thanks to this class, we now have a server set up for our lab where we can host our experiments, stimuli, and data going forward and we can code our own experiments.

We feel more comfortable using the server software and also coding in general. Thank you for teaching us, Tim! :-)

Ethan Hurwitz

Conceptual:
This project seeks to explore a novel question in the field of intuitive archeology. This field is generally concerned with how people make inferences about others from the artifacts they create or own. Early work has found evidence that people employ an inverse planning-based process, like that borne out of the literature on action understanding. However, though we have an idea about the cognitive processes underlying such inferences, a parallel question that remains unanswered regards how people even decide what artifacts to use to draw social inferences from?

There are many prospective artifacts that could be used to draw social inferences from in our environment, so there must be some way that individuals are discriminating those that they believe will contain the most amount and most accurate information over others. If people make rich social inferences from artifacts, as we have evidence that they do, then they should be sensitive to where that information is. In this experiment, we test whether people rationally seek social information from artifacts people choose or create. If people consider the generative process behind individual's choices when they select their artifacts, they should be able to determine when some choices are more informative than others (those made from large spaces of options). Here, we tested two specific predictions that would be true if people are considering the generative process behind others' choices when determining how informative they will be: 1. people will be able to discriminate between more informative choices even if they are made from perceptually identical sets of options. E.g., sometimes there are constraints on the options. 2. people will discriminate between choices that were intentionally made by an individual, and those made for them. If people do consider the generative process behind others' choices, then choices made from a set of options that are not functionally constrained will be rated as more informative, and those made intentionally by the individual will be rated as more informative than those made randomly for them.

Technical:
This particular project required a lot of randomization to control for order effects. There were two blocks of trials: one where people chose items themselves, and one where they got them randomly. Within each block, there were multiple trials of different types. Within each trial, certain sets of objects could appear on one of two cards randomly. On each card, the objects could appear in random positions. To make this easier, I used jsPsych. The general template of jsPsych is a javascript object that takes certain parameters which you can give different values to. By having a soft-coded "template" of what each trial could look like (in the form of a javascript object that had html and css to format the page layout), I could use a custom function to loop through an array of image file names and create the direct src link for an img tag for multiple images at once. This let me create trials and automatically generate multiple images in predetermined areas. As a result of using jsPsych, I had to push all these javascript object "trials" to an

overarching "timeline." However, since there were multiple blocks, each with multiple trials, and I wanted to fully randomize the block order and trial order within each block, to get all trials to the timeline, I had to use a nested for loop to push each trial within each block. That was a first and felt good to accomplish!

After making sure that I defined all the relevant data tags (e.g., a random code to assign to mTurk workers, pulling their mTurk ID, getting a completion time by defining variables containing the time they started and the time they ended then subtracting the two), I used the save data function to send the data to the server. As each completed response would be sent individually, I used a custom shell script to compile all responses into a single excel file. The first bash command changed all the files' extensions from .txt to .csv automatically, and then a second which took the contents of all .csv files after the first one, ignored the header (first line), and copied the contents to the file above it, then removed that file. The result is a single .csv file containing all the data that could be uploaded to R for data analysis.

The parts of the class that were most informative were getting a better understanding of jQuery. That I didn't fully know but I have a much better understanding of now and also know the right search terms and places to learn. Also, and most importantly, I actually understand the save data function now. That process was previously a black box, but knowing HOW to read the php now, I have a general idea of what it's doing and how it's doing it. Specifically, better understanding what things take place server-side and what things take place client-side.

Reina Mizrahi

https://psyc241-rmproject.glitch.me

Sunyoung Park

https://attprec-online.glitch.me/

Spatial attention is capable of targeting specific regions in the visual field to enhance the processing of a presented stimulus. These signals of top-down attention are known to be projected from prefrontal areas to early sensory areas. However, these prefrontal regions lack high spatial selectivity to induce a precise attentional modulation in the targeted location. In this context, the purpose of this experiment is 1) to take a behavioral measure of how precise this top-down attentional modulation can be, and 2) to test whether the attentional enhancement is uniform or uneven across the entire attended spatial location. This online experiment was devised and designed to acquire complementary behavioral data to an ongoing fMRI project which is looking into the precision of neural representations using a similar stimulus display and design.

In each trial, participants are instructed to detect the target, which is a small dot appearing in the periphery, followed by a central cue that indicates a possible location that the target can appear. The cue could either be a line drawn from the fixation point in the direction of the target location (“focused”), or a filled arc indicating the quadrant

where the target could appear (“diffused”), manipulating the width of the top-down attention. There were 12 possible “base” locations where target dot could appear in, at an equidistant eccentricity from the center fixation. The exact location of the target was offset from this “base” location by varying degrees. By comparing the detection performance of targets at different offsets, we can measure how precise top-down attention can be in selectively enhancing the perception of the stimulus input. In addition, there were four levels of target contrast, the lowest being 0, comprising the target-absent trials.

Before taking this class, I was already familiar with other programming languages and have coded experiments in Matlab with Psychtoolbox. However, I knew only the very basics of the HTML elements, had never coded in Javascript, and hence was not at all familiar with the syntax used in HTML, CSS, or Javascript. In the course of learning how to code in these languages in general, and striving to get them to work almost the same as the experiment I had coded in Matlab, I have learned how to find and flexibly use HTML elements and Javascript functions appropriate for my experiment design, and to write my own custom functions in Javascript that would also be useful in other experiments.

More specifically, I used canvas to draw and show simple colored circles for fixations and the target dot, and filled arc and line overlaid on top of the large fixation for cues. As these kinds of features are implemented as readily usable functions in Psychtoolbox, it was a bit of a challenge to figure out what exact options and parameters I would need to set for the canvas to draw the stimuli as intended. It was a whole another challenge to clear only the part of the stimuli that I want to, because the canvas does not operate the same way as a normal div element would, and because I was using multiple canvas elements to effectively control the timing of different aspects of the stimuli on the screen (e.g. erasing only the target stimuli after a brief presentation and then turning the small fixation to black to prompt for response, with everything else held constant). Based on these advancements I have made and the resources I have acquired during class and while working on this project, I feel much more confident in designing and coding web-based experiments.

Cameron Holdaway

Link to Project: http://experiments.evullab.org/PE/index.html
Description:
With the proliferation of data use for predictive modeling in policy decisions, it is increasingly important to understand the tradeoff between efficiency and equality when data are sensitive to demographic or protected classes. For example, what is the "fair" way to give out loans given different FICO scores across races? This remains an open question in algorithmic development, and an important first step towards fair machine learning is understanding human descriptive accounts in these tradeoffs. This project will investigate human intuitions of fairness in algorithmic decisions, by specifically testing subjects’ preferences in the efficiency-equity tradeoff arising from unequal base rates in the underlying data. The goal of this project is mainly to show how varying context and base rate differences affect this tradeoff.

In this pilot experiment, subjects are presented with three situations and an underlying base rate of difference between groups. In each trial, they must decide how to allocate a resource given constraints on efficiency (global optima) and equity (equal conditional probability across groups). We hypothesize that intuitions of fairness will depend on these contextual differences, and that preference for global optima will increase as the difference between group base rates increases. The final project will be expanded to include internal consistency checks of repeated trials and many more iterations of each trial with varying base rates.

From a technical standpoint, most of this project was created from scratch. I have implemented a slider through which subjects can communicate their decisions. The slider updates a series of .svg icons that change color in accordance with the slider value. These changes are governed by an R script that actually calculates the dynamics. The output of the R file is input as a raw JSON file.
The toughest sections have been updating the icons to respond to slider values (which has been a scoping nightmare) and randomizing the base rates and prompts for each trial. One remaining task that I will need to complete is developing a blocking structure whereby prompt-base rate pairings can be repeated and then analyzed for internal consistency.

Hui Xin Ng

Githublink:https://github.com/nghuixin/video_dl_visual_language

The idea here is to assess whether clips of the video are good representations of the words displayed. We want to build a collection of good animation styles that are representative of the meaning of the word, to build HCI systems for video content creators.

Technical aspects: I've never learnt how to use APIs before this, work with large json datasets. I'm getting the server set up soon, am waiting to hear back from Joe Castro. Will be launching this on Mturk in the next week or two!

Michael Allen

Experiment:
https://warp-stoat-penny.glitch.me/

This project aims to investigate the poor memory people have for highly familiar objects such as the US penny. The experiment asks people to engage in a really simple task with the penny, distinguishing it from dimes, quarters and nickels, and then surprises them with a real penny and a fake penny differing by either the direction the head is facing or the position of text on the penny. Previous data shows that even after several

exposures to the real penny, subjects perform only slightly above chance on identifying the real penny from the fake penny.
My hypothesis is that because we don't need to process very many details of the penny to distinguish it from other existing coins, we then don't store many of its details. This is despite consciously experiencing these details, and contrasts with the amnesia explanation that says we forget this information, or approaches that say we don't experience them in the first place. This study contrasts performance on the surprise trial between a real coin condition in which subjects only see other real coins as foils, and a fake coin condition in which they see fake pennies as foils along with real coin foils. If memory for coin details is not only about exposure, but also about the level of informational abstraction required for identification and distinction, then performance on the surprise trials should be significantly better in the fake foil condition. We also question then at various points as to their perception of their memory for the coin. People are normally confident they know what the penny looks like, and then surprised when asked to distinguish between foils, so these questions will get at subject's metacognition and how it is affected by the study manipulations.

Technical aspects;
Having different types of trials was the first technical difficulty, i got around this by setting all trials as the normal trials, and then overwriting these later with the surprise and question trials. I had a lot of text in my welcome page and question pages, so i offloaded these onto separate pages and loaded them into the divs on page load. I have a pulse in the fixation cross that happens 25% of the time and i ask them after each trial if it happened or not,this serves as an attention check and exclusion criteria. To achieve this i have fixation cross background images in the div and i alternate between big and small crosses to make the pulse.
Having different trials at different times was a challenge at first, i had a lot of complicated code to logically determine what functions to run at the end of each trial. I simplified this by adding the appropriate function into the trialStruct so that at the end of each trial when the trial number updates by 1, i can then determine which function to run by calling the function element of the trialstruct at that trial number.