Experiment

Premise

- Subjects will lay in the fMRI scanner and drink either appetitive or no juice. They will be cued before juice consumption about the probability of receiving the appetitive juice. Sometimes this information will be updated once more before consumption.

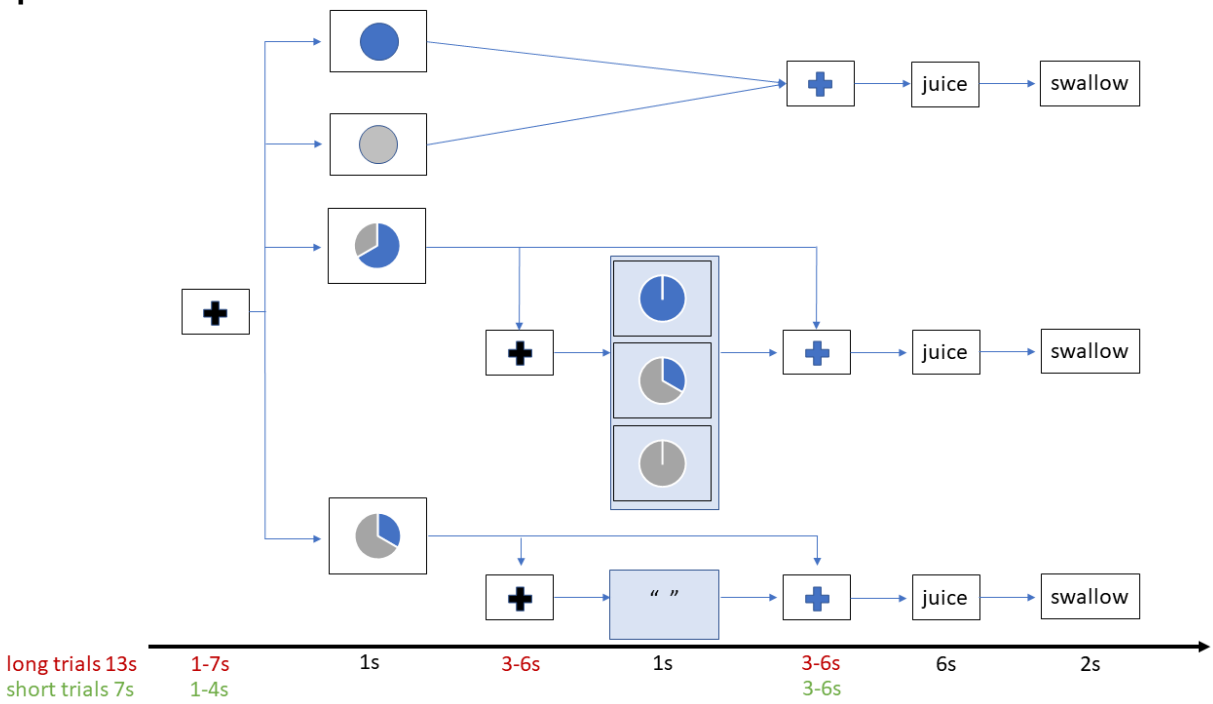
Player

- Just lays there and drinks.

Environment

- A PsychoPy experiment in the scanner. A tube will run from juice press to subject's mouth.

Experiment



- Subjects will fixate on a fixation cross for 1-7s. Then they will see a pie chart, where blue represents the probability of receiving an appetitive juice. On uncertain trials, there is a chance that the pie chart will update one more time. Subjects will be informed that they should base their expectations about receiving the juice on the most recent information only. Black fixation crosses signal that new information will be presented on the next screen. Blue fixation crosses indicate that the subject is about to arrive at the juice / no juice screen. If they arrive at the juice screen, they will hold the juice in their mouth for 6s before being instructed to swallow. If no juice, then they will just wait.
- There are 10 conditions, which is a lot, but it allows us to really check for RPE. We can check negative vs positive vs no RPE, and we can look at magnitude. If

we find a region in frontal cortex that encodes all of this separately from experienced utility, I don't think anyone can argue that it's not RPE:

1. Certain juice.
2. Certain no juice.
3. Likely juice, no update.
4. Likely juice, update certain juice.
5. Likely juice, update unlikely.
6. Likely juice, update certain no juice.
7. Unlikely juice, no update.
8. Unlikely juice, update certain juice.
9. Unlikely juice, update likely.
10. Unlikely juice, update certain no juice.

- 20 trials per condition. So 200 trials total.
    - Short trials (where there is no probability update) are 17s long. There are 80 short trials.
    - Long trials are 23s long. There are 120 long trials.
- Total experiment run time, not including juice tasting, breaks, and instructions, is 68m40s. Split over two sessions, this becomes 34m20s per session. Each session is split into 4 blocks. Each block is 8m35s.

Recording data

- Generate a file that keeps track of:
    - Subject ID
    - Session
    - Block
    - Trial
    - Trial onset (using a timer that starts at the beginning of the block)
    - ITI duration
    - Pie chart 1 duration
    - If update occurs,
        - Fixation cross (for update) duration
        - Pie chart 2 duration
    - Fixation cross (to signal incoming juice/no juice screen) duration
    - Juice/no juice screen duration
    - Swallow screen duration
    - Whole brain BOLD activity (which I believe will record one long dataset for each block)

Interfacing with other hardware

- PsychoPy needs to interface with juice pumps and the fMRI scanner.
    - Scanner sends input "5" when it starts scanning. Use this to begin experiment. And implement lots of experimenter-controlled checks/stops.
    - Not sure how juice pumps work yet.