The **open loop analysis** looks at the tasks that people selected on the FIRST trial after the training phase
because we are only analyzing one trial for each person, the data show the %of participants selecting a task, in each of the 5 groups

Alvaro's analysis (**slide 3**) suggests that, on the first trial:

1. more people selected the 1D task (A1) and the easier task (A6) in the free relative to strategic groups
2. people in the strategic groups changed their selection if they had been informed that one task was unlearnable (A1); strangely, they selected the random task more often – suggesting that they were sensitive to the instruction but did not correctly identify the random task!

Alvaro's analysis (**slide 4**) suggests that, on the first trial people chose according to their estimates of potential future learning (let's call it learnability). An exception is for the easiest tasks, which were also chosen (esp in the free-play groups) if they were assigned low learnability (presumably since ppl figured them out already).

Goal: we want to answer the following questions **quantitatively**. How is the first selection influenced by

(1) training performance
(2) estimate of learnability after training
(3) task instructions (group type)
(4) the knowledge that one of the tasks is unlearnable (informed vs uninformed comparison)

Re-generate Alvaro's histograms

- Re-generate the histograms that Alvaro did;
- not sure how Alvaro determined A6, but we can speak about possible definitions

Add another variable: learnability rating (from the questionnaires);

- try using the raw rating, and a relative rating (e.g, rating-average rating for that participant). We may want to use the relative measure but it's good to show both; plot histograms like the ones Alvaro did.

Which effects are statistically significant?

- Use all 4 groups that received training (leave out the free exploration without training for now)
- Look at two of the variables Alvaro plotted: task ID (A1) and relative %correct (A6), and your new relative learnability variable.

Analysis 1: use a a chi-square test of proportions to compare the distributions

- For each variable (A1, A6 and relative learnability), compare the distributions for each pair of groups (6 possible pairwise comparisons)
- you should have 3*6 = 12 results from these paired chi-square tests
- For each variable, show a comparison matrix with the p value in each entry (highlight the significant ones)

Analysis 2: simply compare the distribution means (medians) using a Wilcoxon test (e.g., is the training performance in one group's first selections different from the performance of another group?)

- you should have 3 variables*6 pairwise comparisons = 12 results
- For each variable, show a comparison matrix with the p value in each entry (highlight the significant ones)

How do people estimate learnability based on performance?

Analysis 1: group data

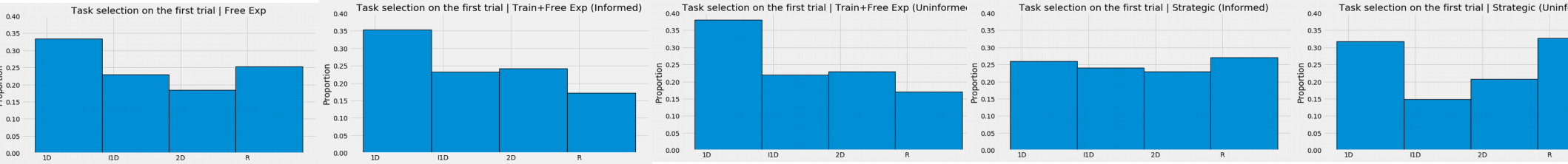
- From the training phase (for the 4 groups that had this phase), gather the %correct across all the training trials; this gives you 4 points for each participant (one per task).
- plot the estimate of future learning as a function of the %correct; each point is one participant for one task (4 points per participant)
- Make a separate plot for each group (free inf, free uninf, strategic inf, strategic uninf),
- In each plot, color the 4 tasks in different colors (this will show approximately how they separate by %correct and by estimates of learnability)
- Fit each plot with a linear trend – see if the slope is significant; if it looks more quadratic try that fit as well
- Plot the 4 plots side by side using the same x and y axes for easy comparison
- **Goal**: get an idea on whether (1) learnability is inversely correlated with performance, (2) the random task is an exception (low performance and low learnability)

Analysis 2: individual patterns

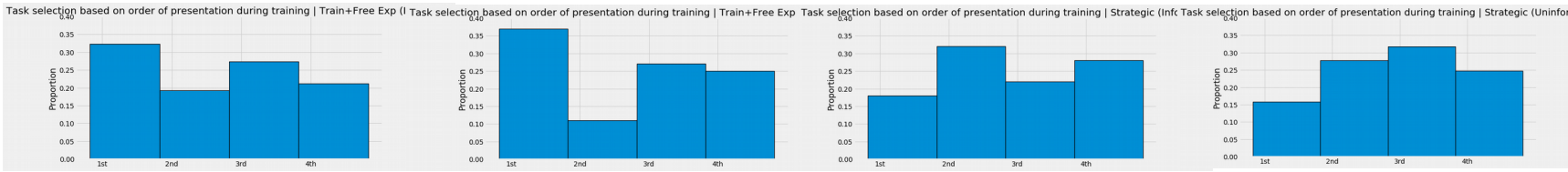
- Do different people have different strategies for assigning learnability? For instance, some people may say that everything is learnable regardless of performance, some may say everything is not learnable regardless of performance, some people may have a linear relation that may be positive or negative, others may have a threshold-like function that is ascending or descending, others may be just random
- Let's say we plot, for each person, performance vs learnability, draw a line connecting the 4 points in the plot, and then cluster these patterns. Would the participants fall into distinct strategies??
- I would try this for all participants together and then see if the strategy groups are evenly distributed across any clusters you may find.

Free Exp | Train+Free Informed | Train+Free Uninformed | Strategic Informed | Strategic Uninformed

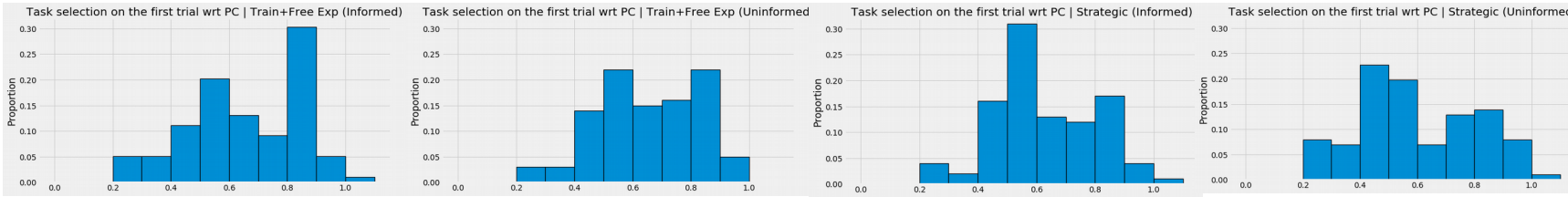
A1 – First selection by task category



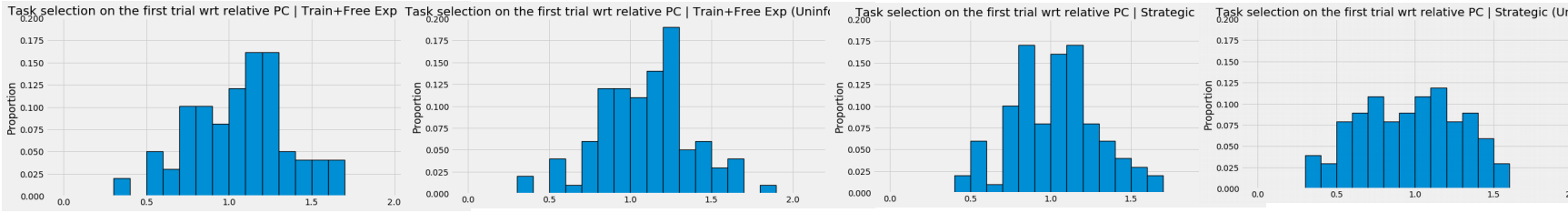
A3 – First selection according to the order of presentation during training



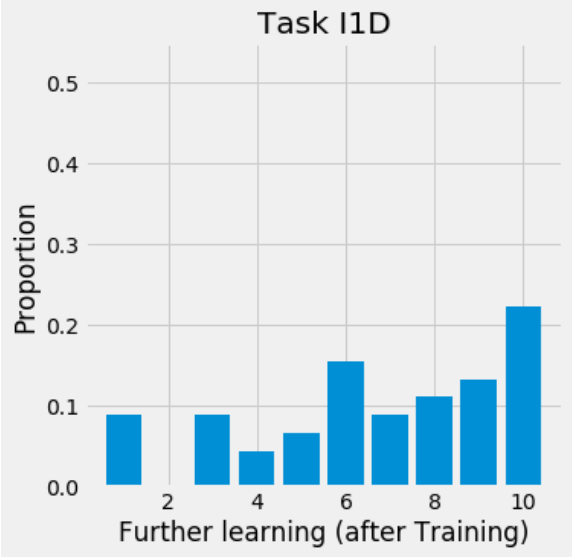
A4 – First selection according to performance (percent correct) during training

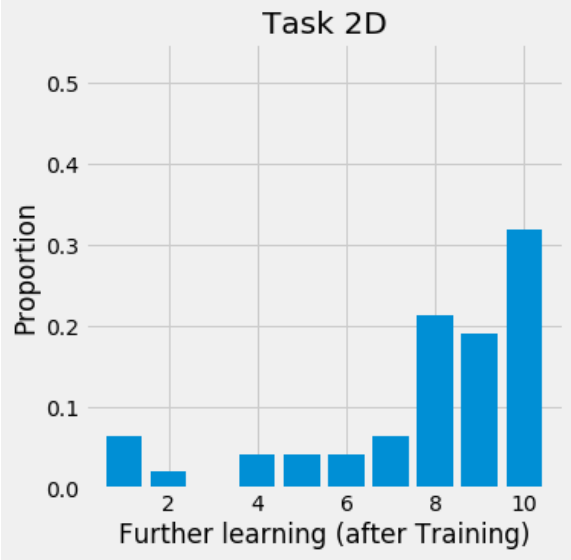


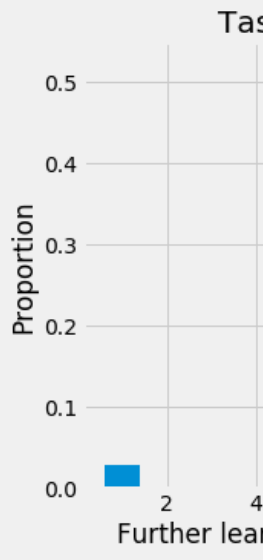
A6 – Relative A4



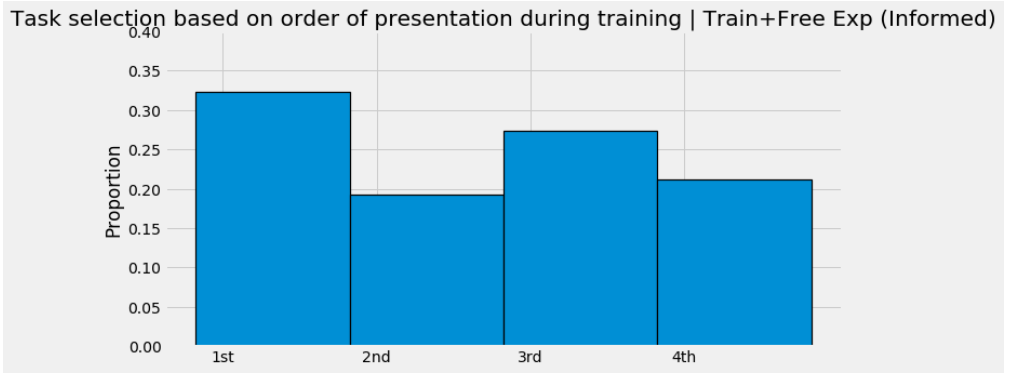
Proportion of people that selected wrt self reported answer about learning after training (per task)

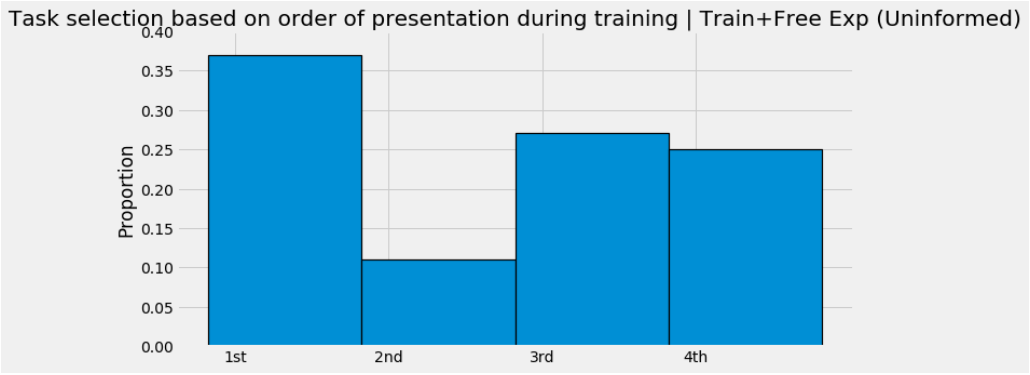


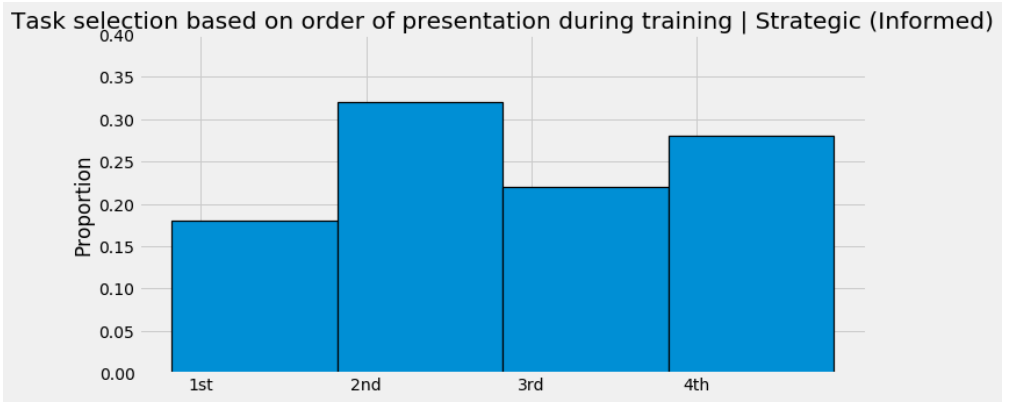


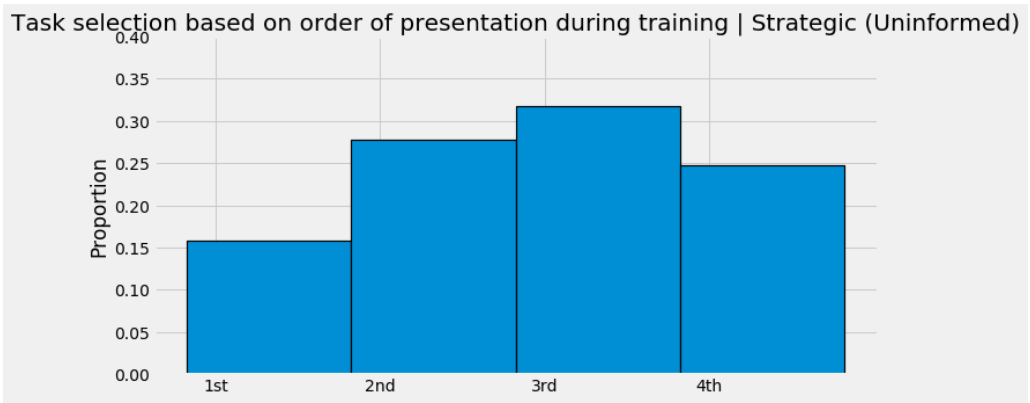


A3 – First selection according to the order of presentation during training

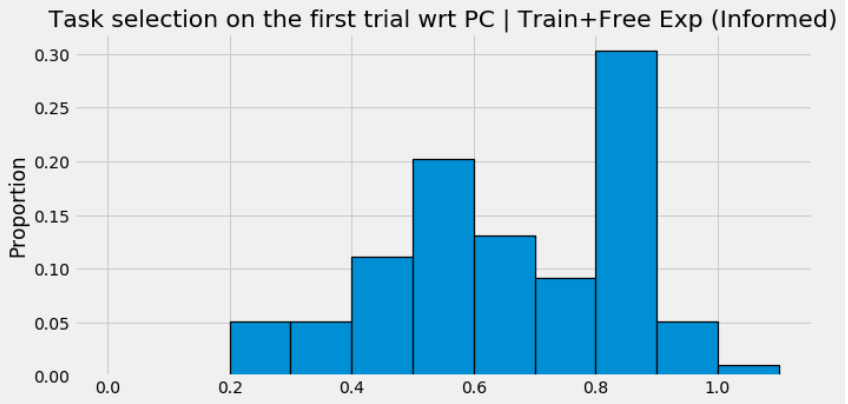


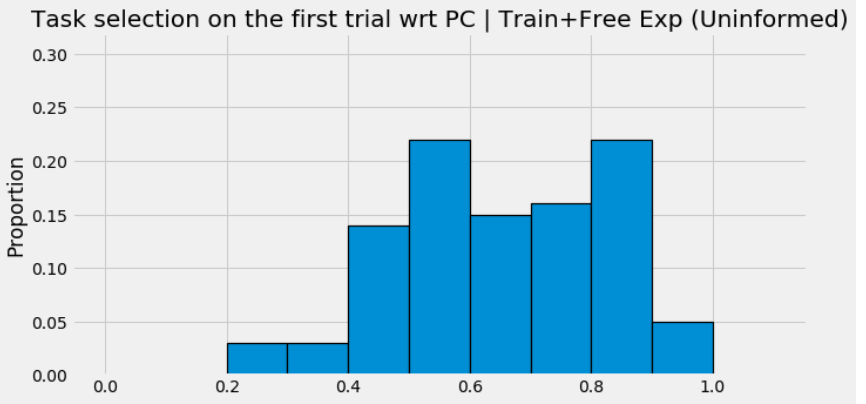


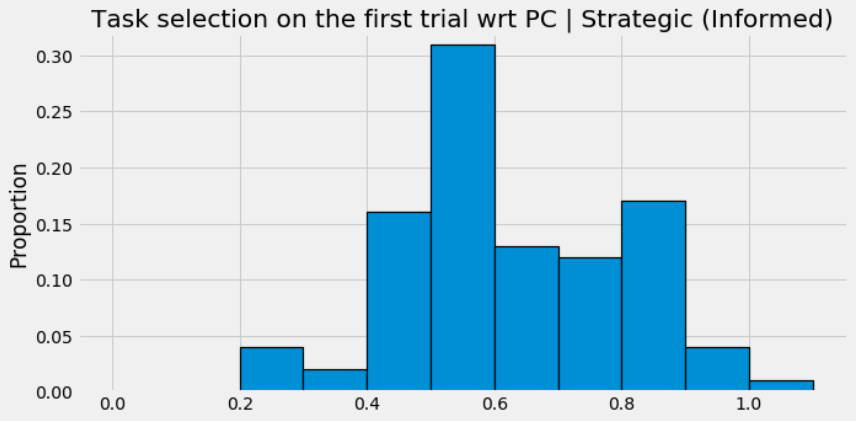


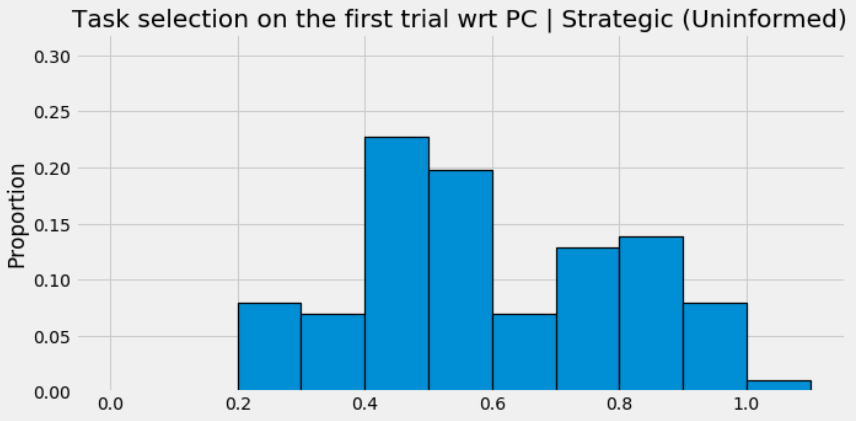


A4 – First selection according to performance (percent correct) during training









A6 – Relative A4