In The Name Of God

HW05

Advanced Neuroscience

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■ Part I - RW rule

□ Q01

Extinction

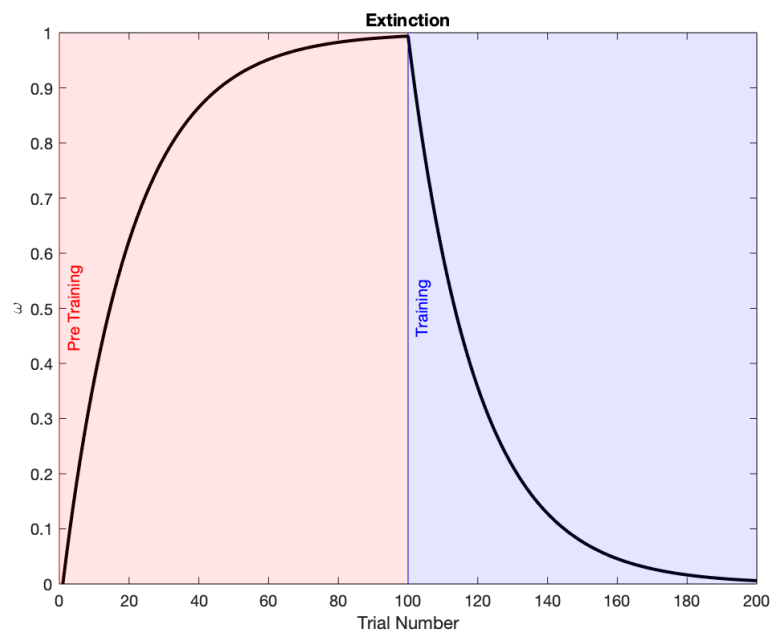

Figure 1: Extinction Paradigm Plot

The extinction paradigm if similar to the plot in the course slides. It rises and the after the stimuli is gone, decreases.
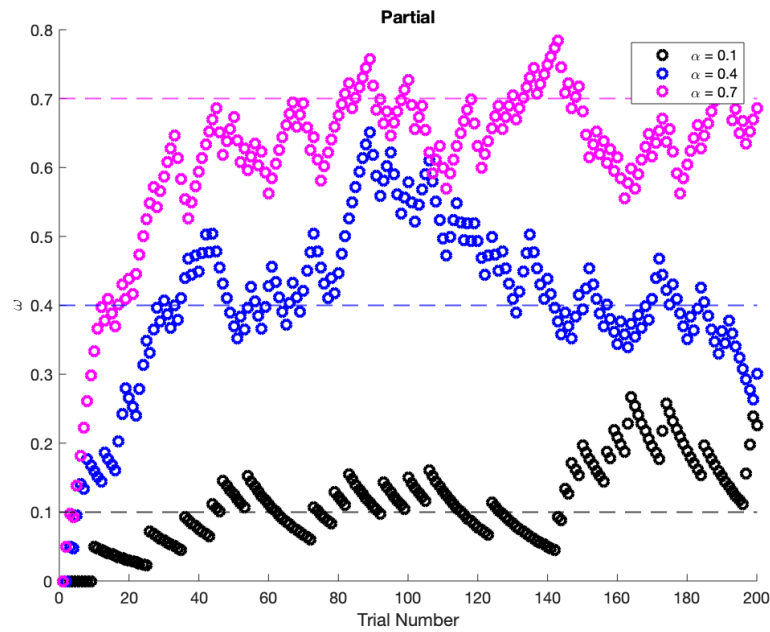
Partial

Figure 2: Partial Paradigm Plot

As I expect, the weights have taken the same value as their stimuli probability (Figure 2).
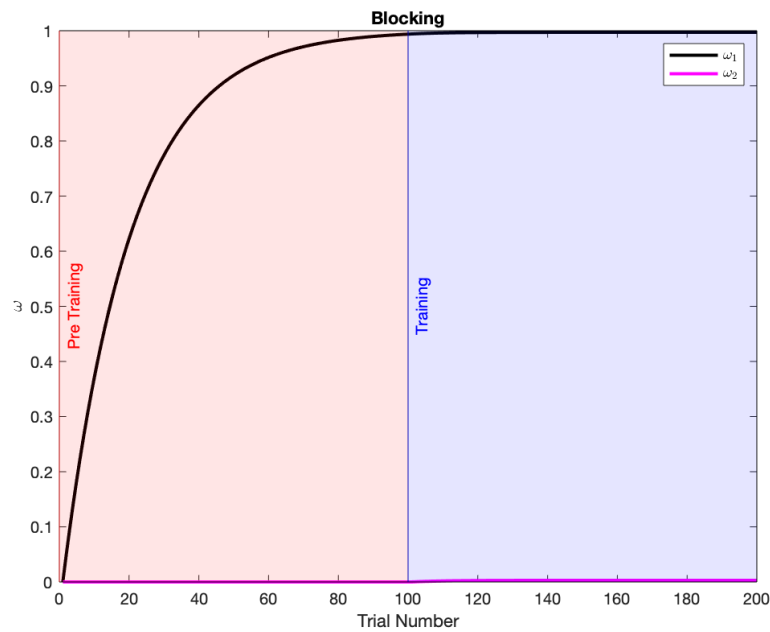
Blocking

Figure 3: Blocking Paradigm Plot

Similar to the results of the question set table, the value of w_1 becomes 1 and the value of w_2 doesn't change too much from 0, while there is an small increase in the w_2 during the training trials.
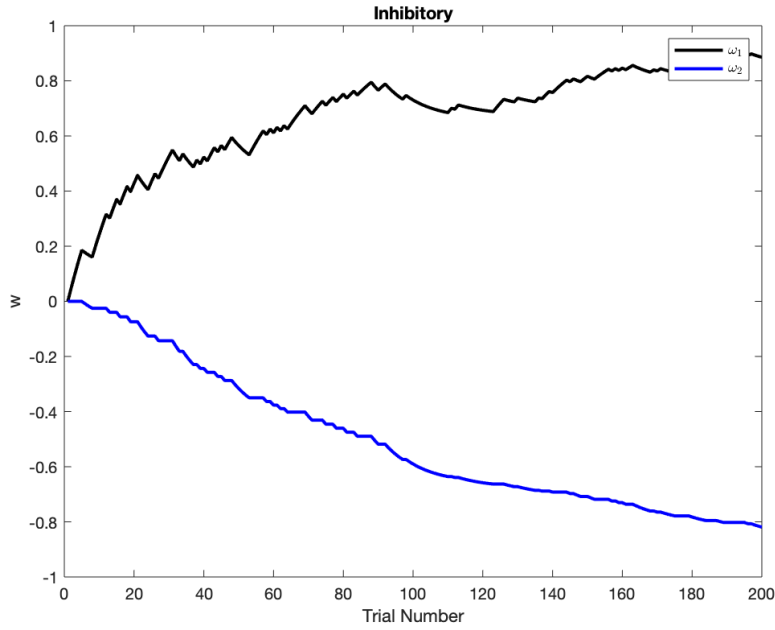
Inhibitory

Figure 4: Inhibitory Paradigm Plot

The results in Figure 4 are same to the question set table and as I expect the value of w_1 goes to 1 and the value of w_2 goes to -1 over the trials.

Overshadow

(a) $\alpha_1 = 0.5$ & $\alpha_2 = 0.5$
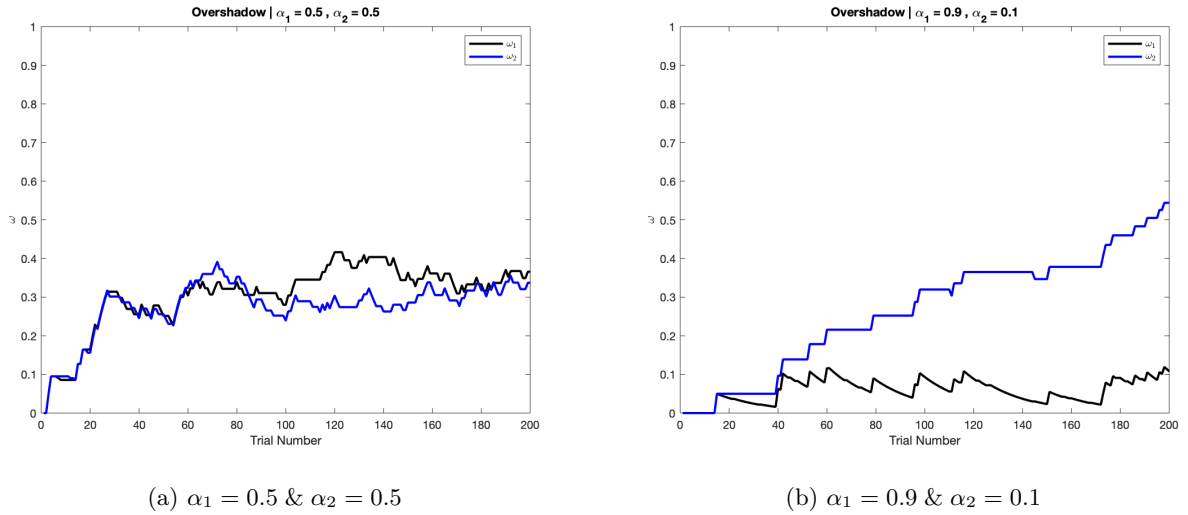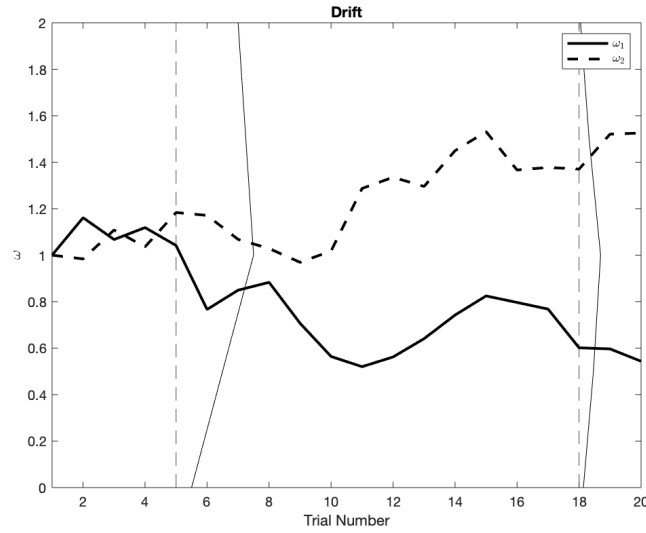
(b) $\alpha_1 = 0.9$ & $\alpha_2 = 0.1$

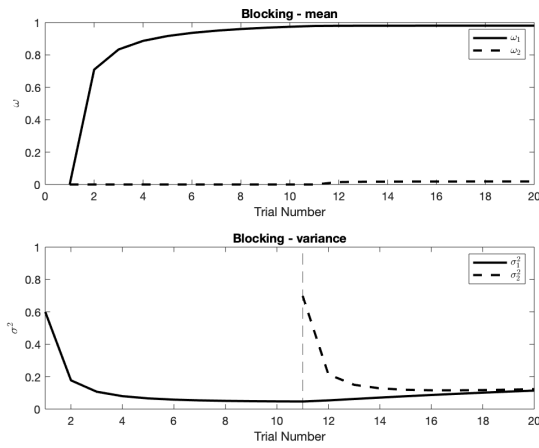Figure 5: Overshadow Paradigm Plot

☐ Q02

In the overshadow paradigm, most of the time stimulus end up having different values because one of the on of them is silenter than the other one, so while the reward will be given in a few number of the trials, the stimuli which has higher probability will has lower weight.
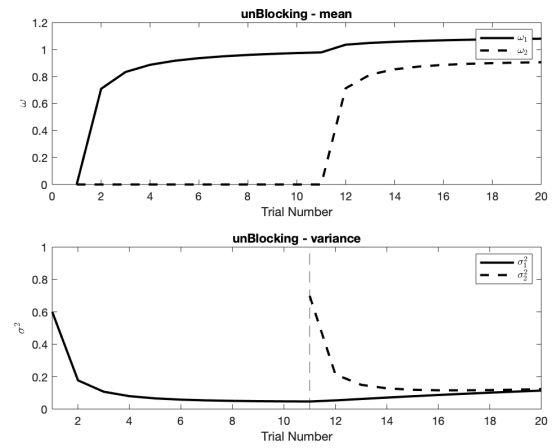
■ Part II - Kalman Filter

□ Q01

(a) Drift

(b) Blocking

(c) Unblocking

Figure 6: Stimulation of different paradigms using Kalman FIlter

The parameters for obtaining Figures 7 and 7 is obtained from the paper or is set to the values which tend to the most similarity to the paper figures. The used parameters values are written in Table 2.

Table 1: Parameters of Kalman Filter

Process Noise	0.01
τ	0.5
w_0	0
$\sum t_0$	0.06
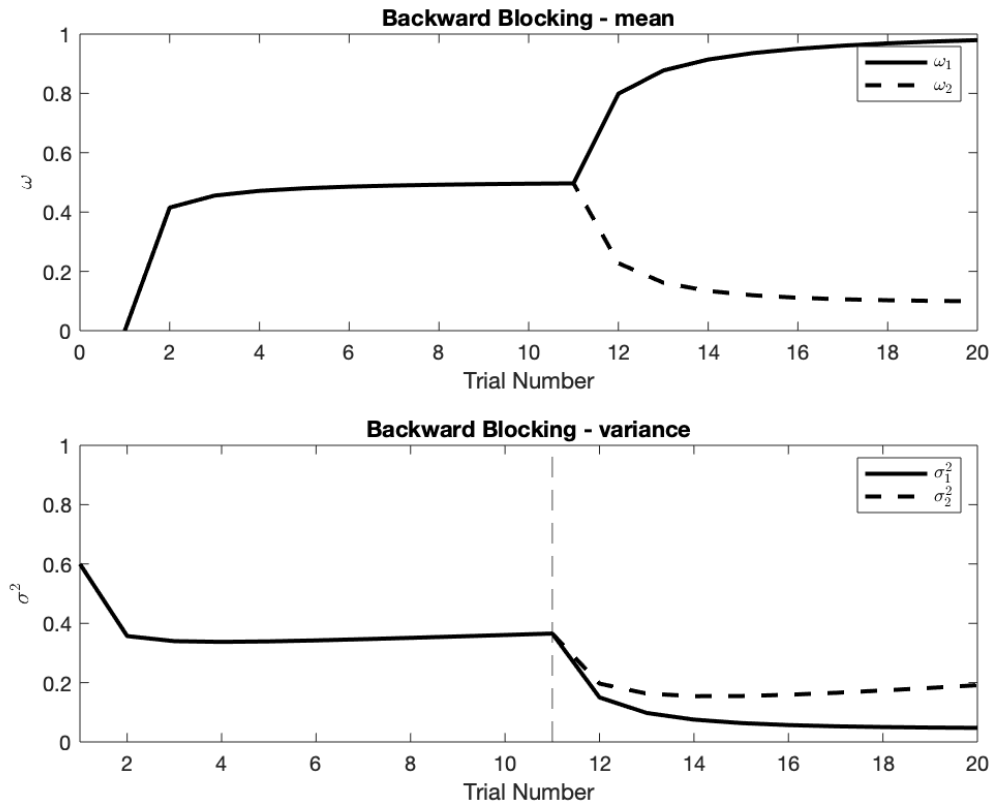
(a) Backward Blocking

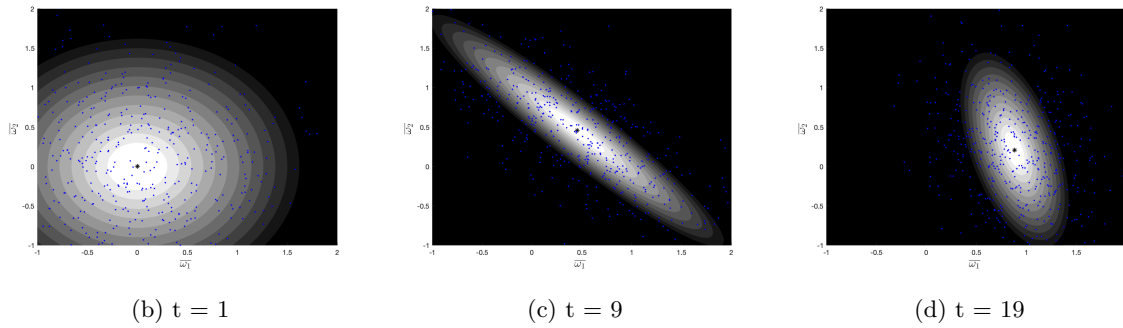(b) t = 1   (c) t = 9   (d) t = 19

Figure 7: Stimulation of Backward Blocking using Kalman Filter and contour plots of the joint distribution of $\bar{w}(t)$

The blue plots in the Figure 7 are obtained from the joint distribution of w_1 and w_2.

☐ **Q02**

☐ **Q02**