**Fig. 4, Result section:**

It’s been reported that an initial motor adaptation has faster time constant in comparison with subsequent adaptation for the oppositely directed stimulus. [8-10] We’ve tested the multi-rate model under different stimuli and the result clearly shows we have faster time constant for the initial adaptation.

The first stimulus is Anterograde interference which consists of a number of trials (In this case: 30, 60 and 120) as adaptation and 50 trials as deadaptation (Figure 4A). In figure 4B, the raw response of multi-rate model is shown; Also, in figure 4D and Figure 4F, you can see the response of Gain-specific model and Single State model. By comparing the time constants of each model (Fig 4C,E,G), results show that only multi-rate model has higher time constant in the initial adaptation; Single state model shows no change of time constant and Gain specific model shows faster time constant for the secondary adaptation. Since we have a bias against the deadaptation, it is expected to have slower time constant in the secondary adaptation in multi-rate model.

**Fig. 5, Result section:**

The second stimulus is Deadaptation Simulation which consists of a number of trials (In this case: 30, 60 and 120) as adaptation and then trials back to base line (Figure 5A). There are studies reporting that the rate of deadaptation is faster than the rate of initial adaptation [10,11]. Results show that the multi rate model and the gain specific model show faster rate of deadaptation while the single state model shows no changes in the rate (Figure 5C,E,G). Also it can be inferred that by increasing the number of adaptation trials, the rate of deadaptation decreases.

**Fig. 6, Result Section:**

It is reported that the time constant of adapting to a lower level of previously learnt adaptation is faster than deadaptation to baseline. In figure 6 we showed that the multi rate model can explain this effect while the single state model and the gain specific model cannot. It can be seen that the Gain specific model shows somehow inverse effect.

Fig. 4 Caption:

Figure 4. Anterograde Interference Simulation

(A) Experiment Paradigm. (B, D, F) Raw simulation results of Multi Rate model, Gain Specific model, and Single State model. Blue: initial adaptation. Red, Green, Cyan: secondary adaptation after 30, 60, 120 initial adaptation trials. (C, E, G) Direct performance comparison of Multi Rate model, Gain Specific model, and Single State model. In this column learning curves are shifted and scaled so that the desired performance is one. In this paradigm only multi-rate model has higher time constant in the initial adaptation comparing to the time constant of deadaptation; Single state model shows no change of time constant and Gain specific model shows faster time constant for the secondary adaptation. Since we have a bias against the deadaptation, it is expected to have slower time constant in the secondary adaptation in multi-rate model. And the results show that in multi rate model we get slower time constant by increasing the number of adaptation trials.

Fig. 5 Caption:

Figure 5. Deadaptation Simulation

(A) Experiment Paradigm. (B, D, F) Raw simulation results of Multi Rate model, Gain Specific model, and Single State model. Blue: initial adaptation. Red, Green, Cyan: secondary adaptation after 30, 60, 120 initial adaptation trials. (C, E, G) Direct performance comparison of Multi Rate model, Gain Specific model, and Single State model. In this column learning curves are shifted and scaled so that the desired performance is one. In this paradigm the multi rate model and the gain specific model show faster rate of deadaptation while the single state model shows no changes in the rate. Also it can be inferred that by increasing the number of adaptation trials, the rate of deadaptation decreases.

Figure 6. Down-Scaling Simulation

(A) Experiment Paradigm. (B, D, F) Raw simulation results of Multi Rate model, Gain Specific model, and Single State model. Blue: initial adaptation. Red, Green, Cyan: secondary adaptation after 30, 60, 120 initial adaptation trials. (C, E, G) Direct performance comparison of Multi Rate model, Gain Specific model, and Single State model. In this column learning curves are shifted and scaled so that the desired performance is one. In this paradigm the multi rate model shows the effect of having faster time constant of adapting to a lower level of previously learnt adaptation than deadaptation to baseline. The Gain specific model shows somehow inverse effect.