

Supplemental Information

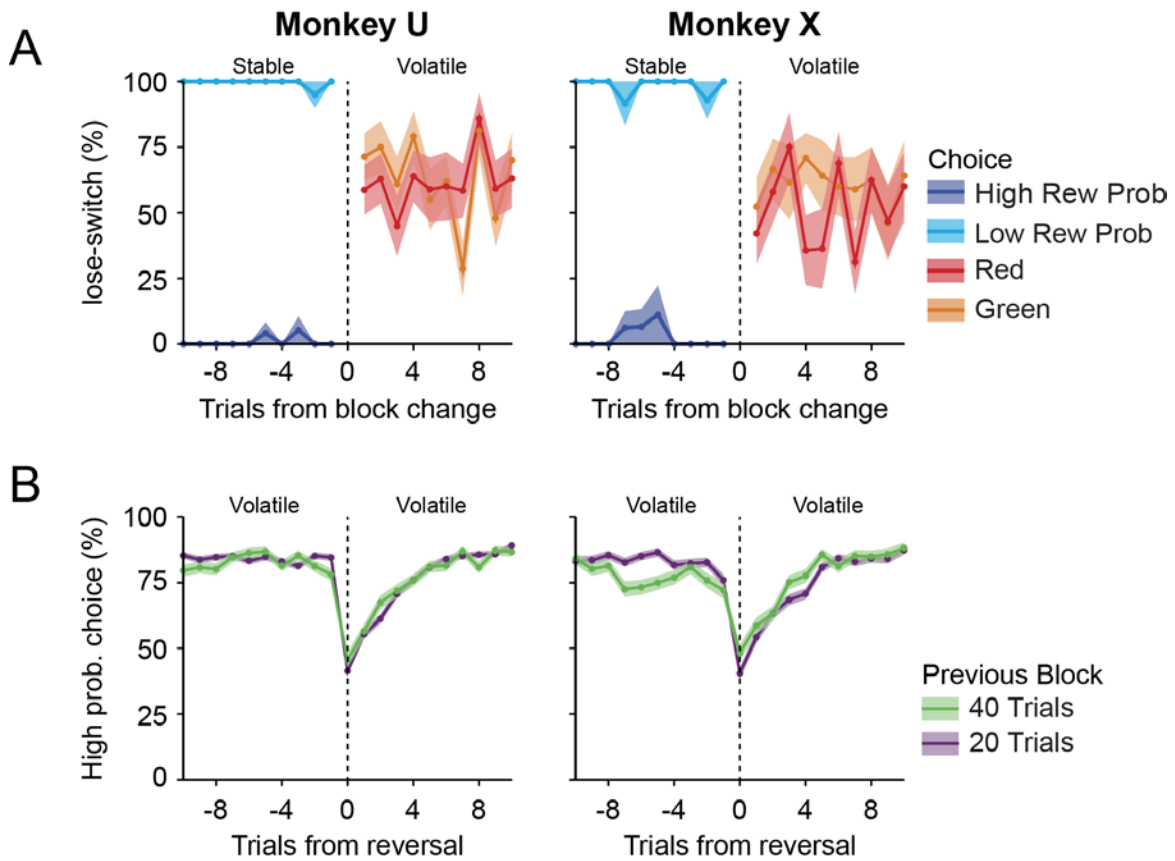


Figure S1. Behavioral changes after the reversal of reward probabilities. Related to Figure 2. (A) The probability of switching to the other target color (or shape) when the previous choice was unrewarded before and after the onset of volatile blocks, plotted separately according to the nature of target chosen in the previous trial. The animals adjusted their preference for different targets based on the previous outcome immediately after the onset of the volatile block. Only trials in which reward magnitude was the same for both targets in the current trial were included in this analysis. (B) The probability of choosing the high reward-probability target before and after their reversal in volatile blocks, plotted separately according to the size of the previous block. Trials in which the ratio of small vs. large reward magnitudes was >2 were excluded in this figure, since the animal's choice in those trials was strongly influenced by the reward magnitudes. Shaded areas represent \pm SEM.

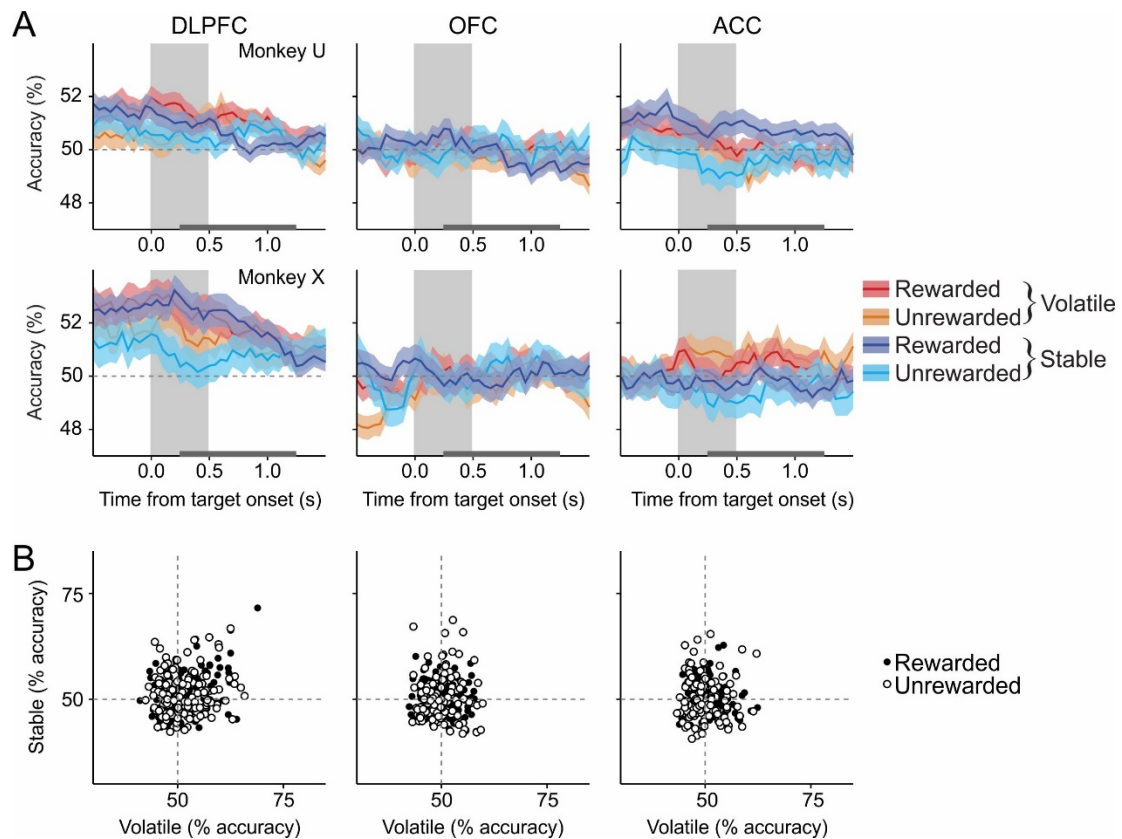


Figure S2. Signals related to the previous action. Related to Figure 3. (A) Time course of the average decoding accuracy for the previously chosen location, plotted separately for two animals. Neither previous reward nor volatility significantly affected decoding accuracy for either animal in any cortical region (all main and interaction effects in a reward \times volatility repeated measures ANOVA, $p > 0.05$ for all regions in both animals). Shaded areas represent \pm SEM. **(B)** The accuracy of decoding previously chosen location following rewarded and unrewarded trials for individual neurons in each block type.

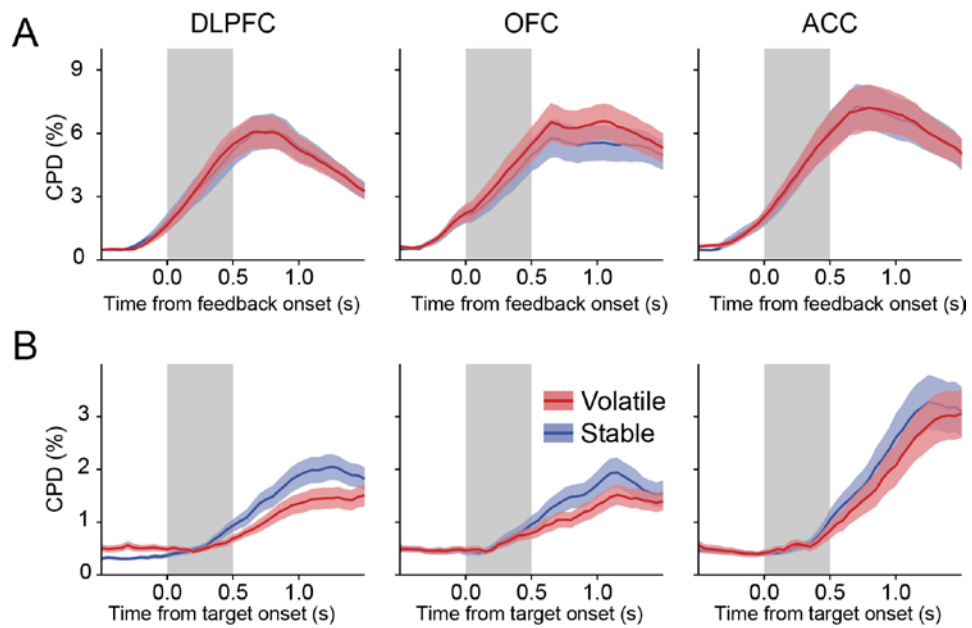


Figure S6. Signals related to the difference in reward magnitude and outcome in the current trial. Related to Figure 7. (A) Time course of the mean CPD for the outcome of the current trial. Shaded areas represent \pm SEM. **(B)** Time course of the mean CPD for the difference between the chosen and unchosen magnitudes. During the post-target period, there was no significant effect of volatility or region (all main effects and interactions in a region \times volatility mixed effects ANOVA, $p > 0.05$).

