

# Learning in visual regions as support for the bias in future value-driven choice

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## Supplementary

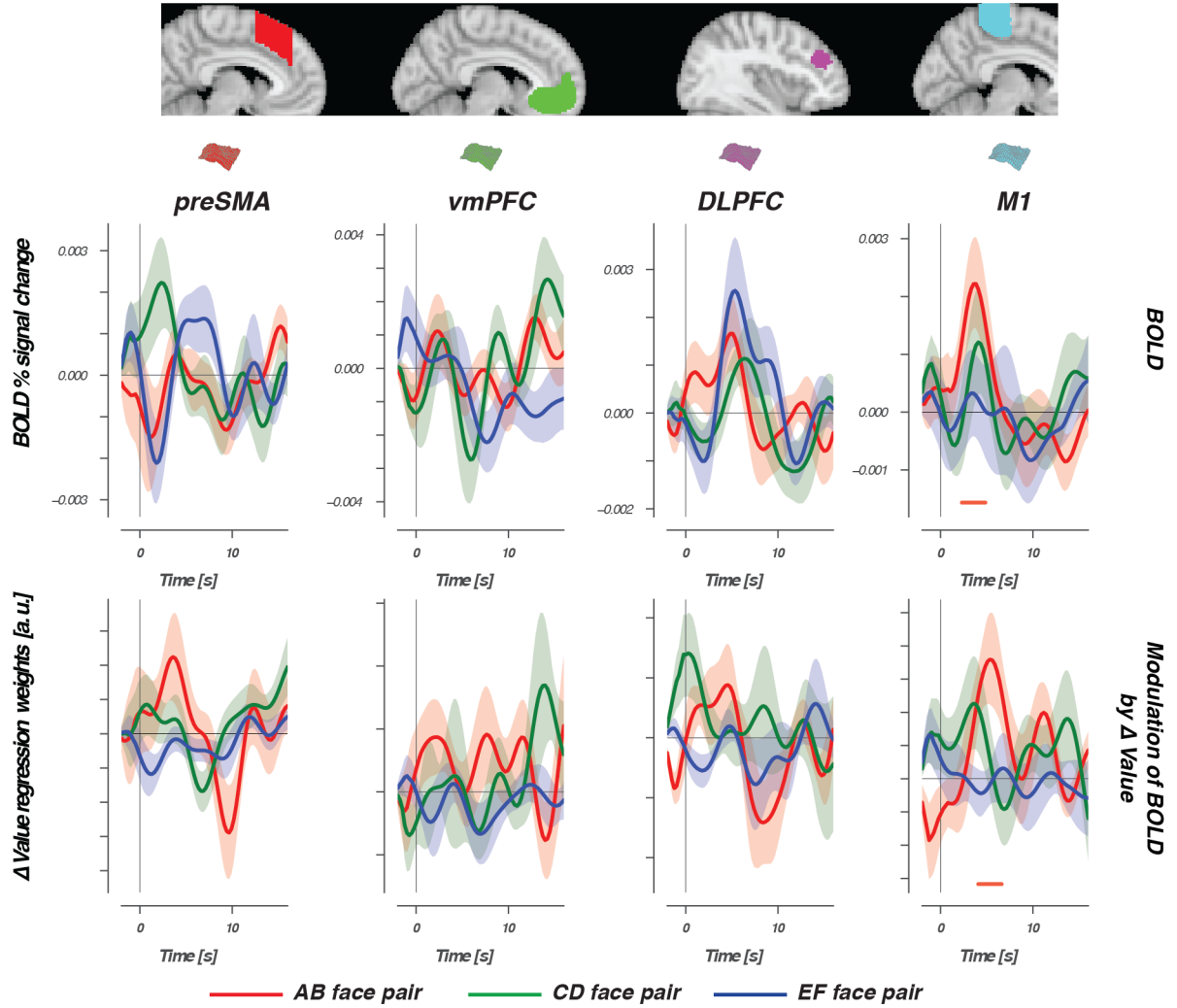


Figure 1: **BOLD and the modulation of  $\Delta$ Value in the learning phase for cortical regions.** The top row shows the FIR-estimated BOLD signal time-course, time-locked to the presentation of AB (red lines), CD (green lines), and EF (blue lines) face pairs for the additional cortical regions that were evaluated with RF. The bottom row displays the differential modulation by value ( $\Delta$ Value = modulation Q chosen – modulation Q unchosen). The horizontal lines show the interval in which the modulation was significantly stronger for Q chosen. With the presentation of AB faces, only the BOLD responses in M1 was modulated more by values of the chosen stimulus when compared to values of the unchosen stimulus. Confidence intervals were estimated using bootstrap analysis across participants ( $n=1000$ ), where the shaded region represents the standard error of the mean across participants (i.e. bootstrapped 68% confidence interval).

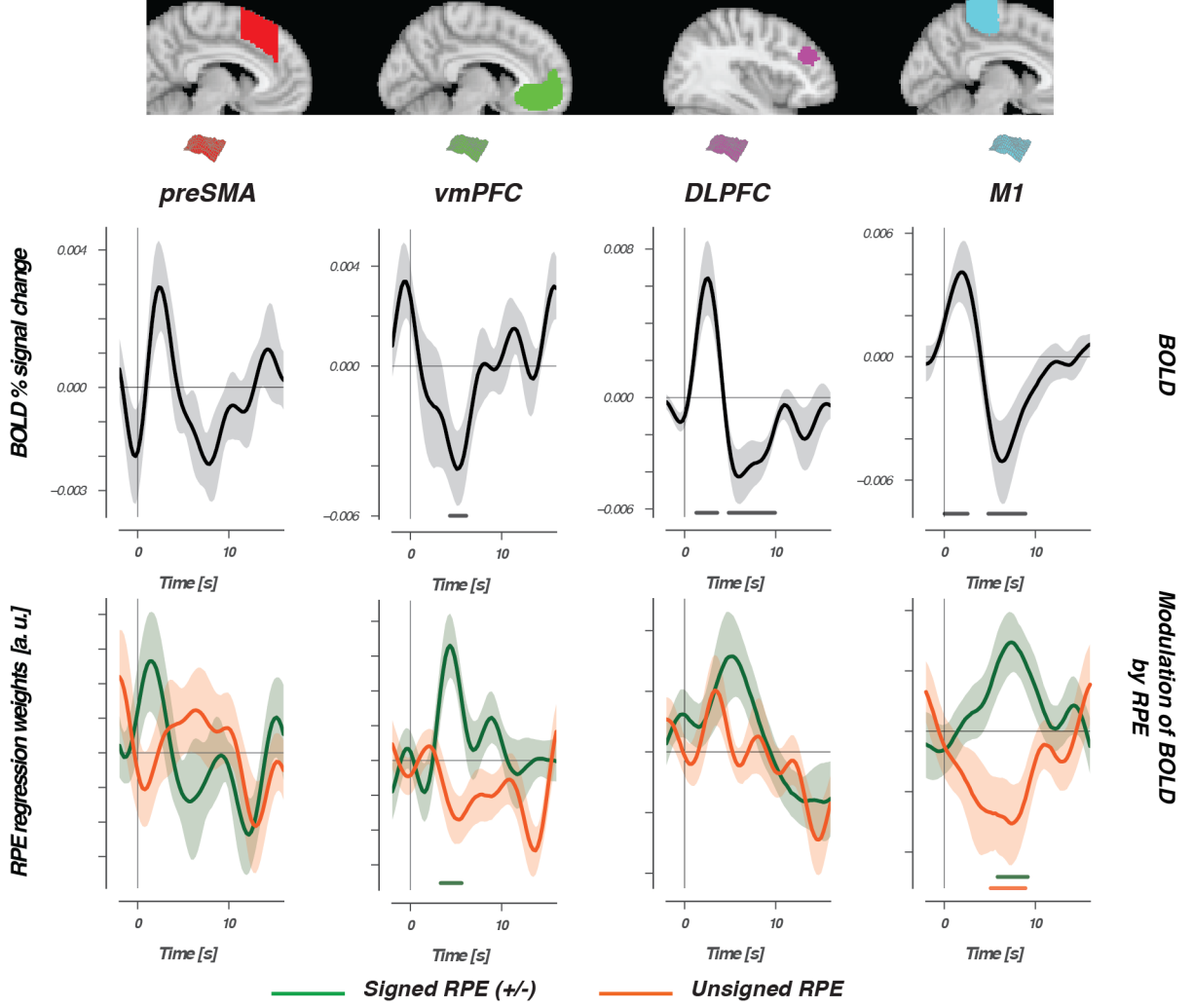
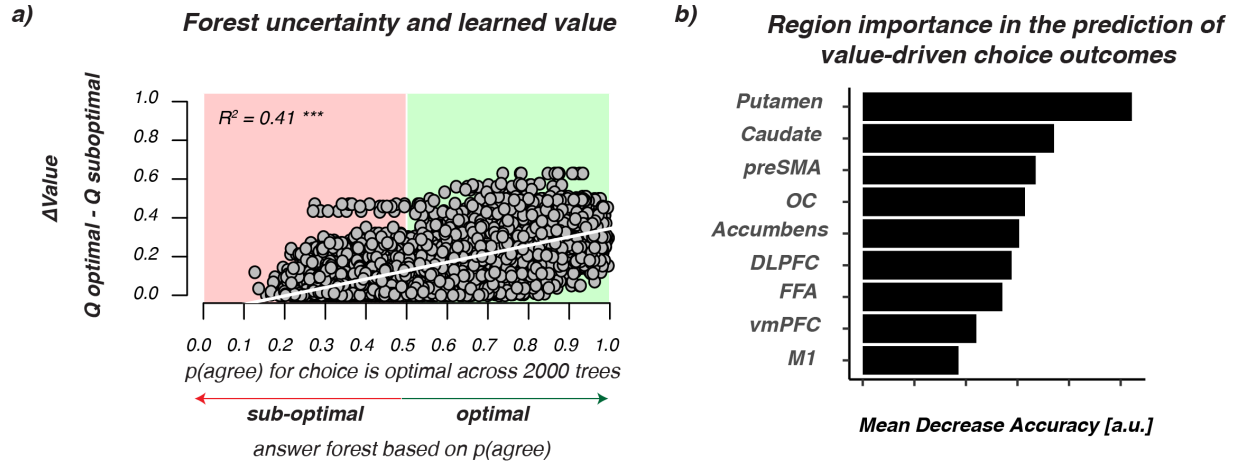


Figure 2: **Reward prediction errors and BOLD during the learning phase in cortical regions.** The top row shows the FIR-estimated BOLD signal time-course, which was time-locked to the presentation of choice feedback, shown for the additional cortical regions evaluated with RF. The bottom row displays modulations of the estimated BOLD time-course by signed (green lines), or unsigned (orange lines) RPEs. The horizontal lines represent the interval in which signed or unsigned RPEs contributed significantly to the modulation of BOLD in the multiple regression. Note that, both variables were always evaluated simultaneously in one GLM.



**Figure 3: Uncertainty and Ranking of RF evaluated for all participants.** **a)** Plotted relationship between the uncertainty of the forest in each prediction (x-axis) and delta value (y-axis) for all participants.  $\Delta Value$  was computed for each transfer-phase trial using the end ( $Q$ ) beliefs that participants had about each face at the end of the learning phase. Forest uncertainty is defined as the proportion of trees saying ‘yes! the choice on this trial was optimal’. When this ratio is below 0.5 the forest will predict ‘no’ (sub-optimal), otherwise the prediction is ‘yes! the choice on this trial was optimal’ (optimal).  $R^2$ =adjusted  $R^2$ . **b)** Plotted ranking of the ROI’s in their contribution to the predictive accuracy of RF evaluated with all participants.