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Supplemental Information

Medial Prefrontal Cortex Predicts

Internally Driven Strategy Shifts

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Supplemental Figures

Figure S1, Related to Figure 2

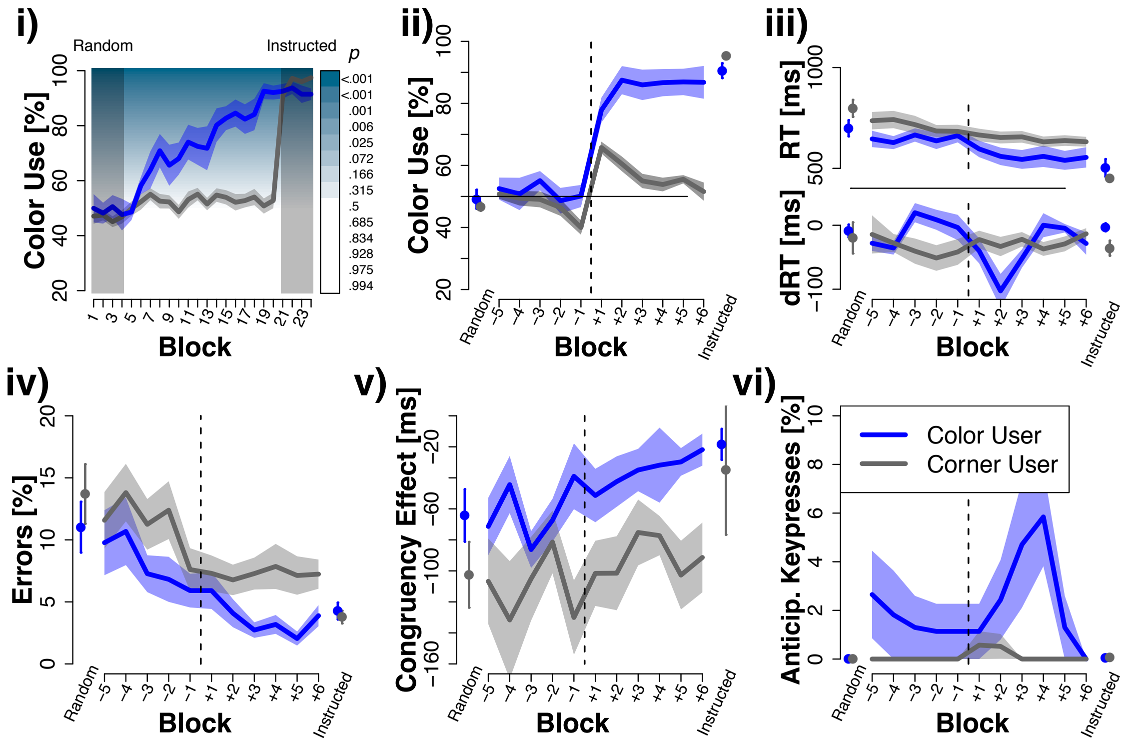

Figure S1. *Behavioral results with alternative time locking of corner users.* Instead of random assignment, corner users' switch-points were defined based on the CUSUM algorithm. Otherwise, the figure corresponds in all respects to Figure 2 of the main article. (i) Average percent of choices consistent with color when stimulus position was ambiguous across blocks (one block = 84 trials). (ii) Time locked color use data. In comparison to Figure 2, this shows that the sheer power of the CUSUM algorithm is able to cause a dip and increase in corner users' color use around the time of the switch. The increase in color use is transient and not as strong as in color users, however. (iii-vi) Importantly, the results of all other analysis on RTs or errors are qualitatively the same as compared to Figure 2.

Figure S2, Related to Figure 3

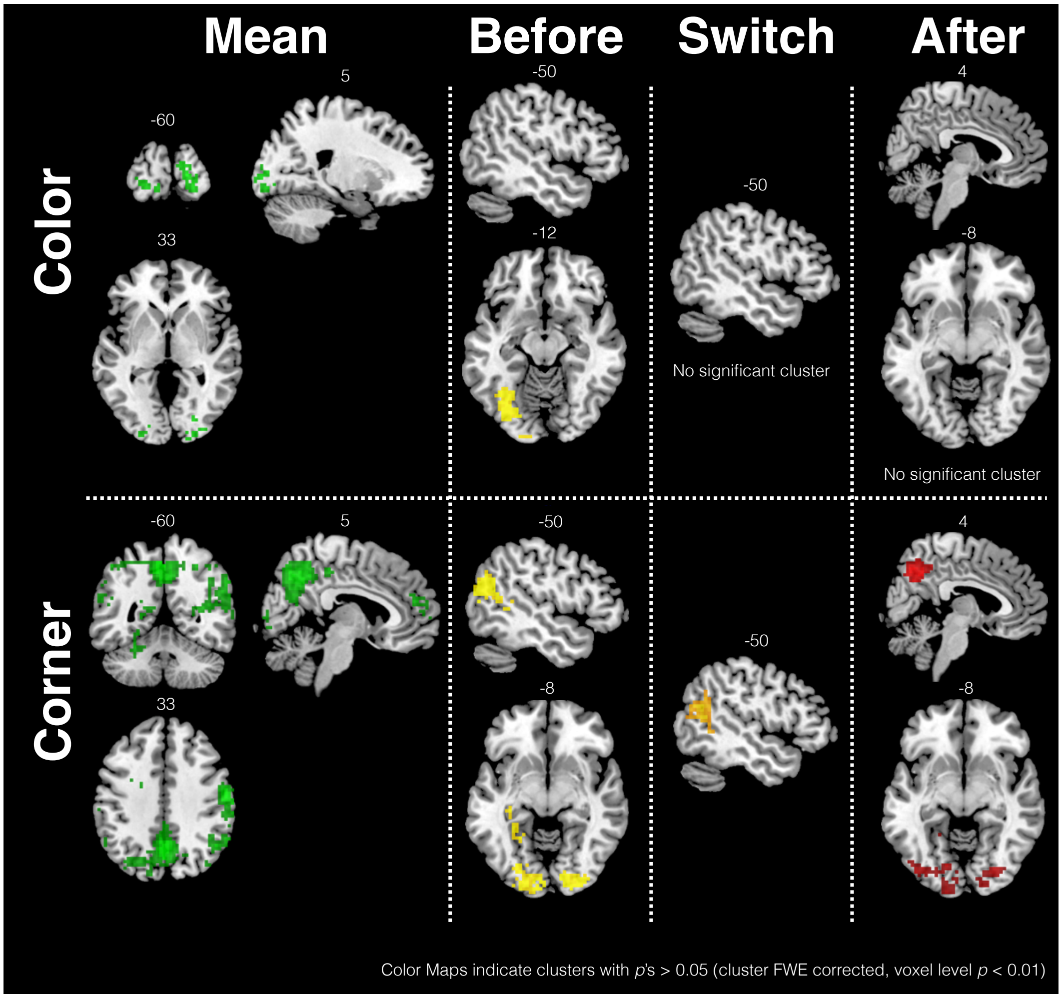

Figure S2. *Classification results for corner users*. The figure shows brain maps indicating significant color (upper row) and corner (lower row) classification among corner users. The analysis is complimentary to the analyses shown in Figs. 3 and 4 in the main paper (same time windows, and statistical threshold). The maps are divided into analyses considering the whole time series (*mean*, 1st column from left), all blocks before the switch (*before*, 2nd column), only the two blocks immediately before the switch (switch, 3rd column) and all blocks after the switch (*after*, 4th column). Corner users' switch was defined based on the switch points of color users (see Methods). Because the definition of time windows with this method might be noisy, the image showing the mean across all time points is the most easy to interpret, whereas other results have to be interpreted with caution. Empty brain images indicate that this respective analysis did not yield any significant results. In summary, we found that among corner users corner decoding worked well in all time windows and showed significant classification in visual cortex, precuneus, MPFC, lateral PFC and pre-and postcentral gyri, but color classification was much weaker throughout and confined to visual cortex.

Figure S3, Related to Experimental Procedures

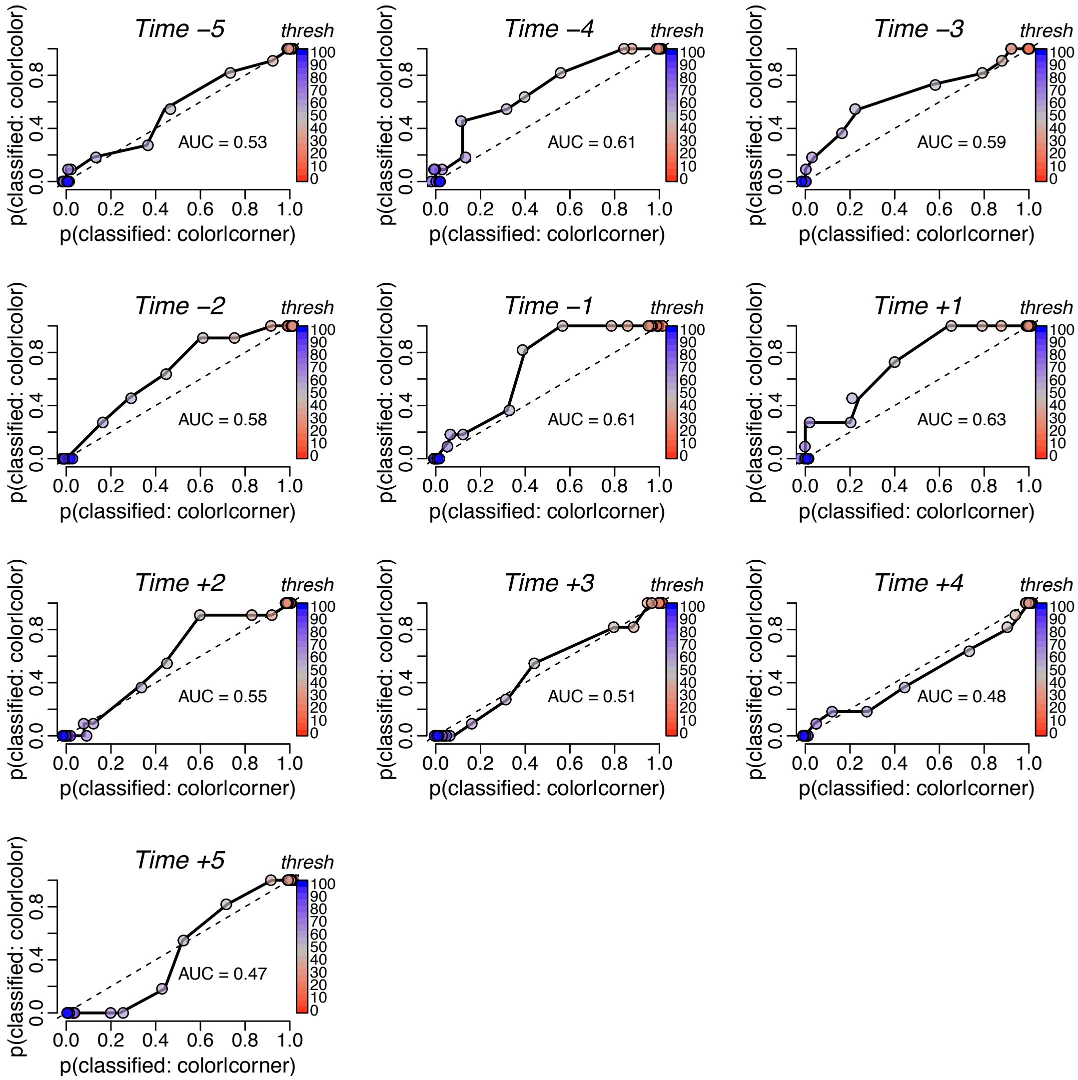

Figure S3. *Time resolved ROC analysis for classification of participants.* Each panel shows a receiver operating characteristic (ROC) curve for one block (see title of plot). This analysis is complimentary to the Experimental Procedures and Figure 5 in the main paper. In each ROC analysis, participant group (color or corner user) was predicted using different thresholds on the color classification accuracy within MPFC. As in the main analysis, the relevant ROIs were defined in a cross-validated manner and the analysis was run on time courses smoothed with a running average of 2 (see also Fig. 3, 4, 5). The sensitivity (proportion of subjects classified as color users, given that they are indeed color users, y-axis; p(classified: color I color)) and specificity (proportion of subjects classified as color users, given that they are corner users, x-axis; p(classified: color I corner)) are plotted as points within the graph, whereby different thresholds are color-coded. To better illustrate overlapping points, colors are semi transparent and jittered along the x-axis (Gaussian, SD = 0.01). As can be seen, the time-points around the switch allow the best classification across a range of thresholds.

Figure S4, Related to Figure 5

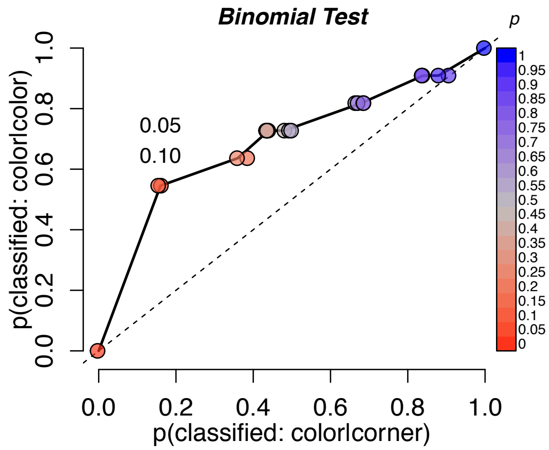

Figure S4. *Prediction of strategy switch without time-locking.* To test whether we could also predict participants' choice to switch strategy without knowledge about the switch-point, the classification was repeated without time-locking data. To this end, we applied a binomial test on the number of runs in which color classification was greater than 50%. The curve shows the sensitivity and specificity of this test if different thresholds are applied; see Fig. S3 (a ROC curve is shown for different thresholds of *p*). Best classification could be achieved using the conventional p = .05 or .10 thresholds (points overlap, see note in plot). ROI selection and time course smoothing as in Figs. 3, 4, 5 and S3.

Supplemental Tables

Table S1, Related to Figure 3

ID	*Centroid MNI Coordinates*			*Max$_{peak}$ (%)*	*No. Vox*	*Region*	*Dist (Vox)*
	X	*Y*	*Z*				
1	3	56	22	93.3	45	Medial Frontal Gyrus (R)	2.8
2	3	56	40	91.1	5	Medial Frontal Gyrus (R)	4.3
3	12	59	16	85.2	9	Medial Frontal Gyrus (R)	4.8
4	9	44	19	89.2	45	Anterior Cingulate Cortex (R)	5.9
5	-3	41	22	87.3	60	Medial Frontal Gyrus (L)	6.9
6	-6	41	13	91.8	18	Anterior Cingulate Cortex (L)	9.1
7	-18	44	13	92.6	26	Superior Frontal Gyrus (L)	10.2
8	15	35	49	88.3	83	Superior Frontal Gyrus (R)	11.3
9	6	41	-23	83.8	8	Gyrus Rectus (R)	17.8
10	-6	2	28	94.1	18	Middle Cingulate Cortex (L)	19.4
11	-45	26	34	90.7	13	Middle Frontal Gyrus (L)	20.3

Note: *Characteristics of clusters with significant classification during switch for individual color using subjects.* The table is sorted by distance to the group peak and contains the locations (centroids), peak decoding accuracies, number of voxels, AAL atlas labels (Tzourio-Mazoyer et al., 2002) and peak-to-peak distances from the group result. To determine these clusters, we applied a threshold of 80.6% to the individual decoding accuracy maps (p = .01 according to empirical distribution of corner users, minimum cluster size: 5 voxels). Because the main purpose of this table is to shed some light on the individual clusters contributing to the group cluster, we list only the peak that is closest to the peak group result.