Supplementary Information

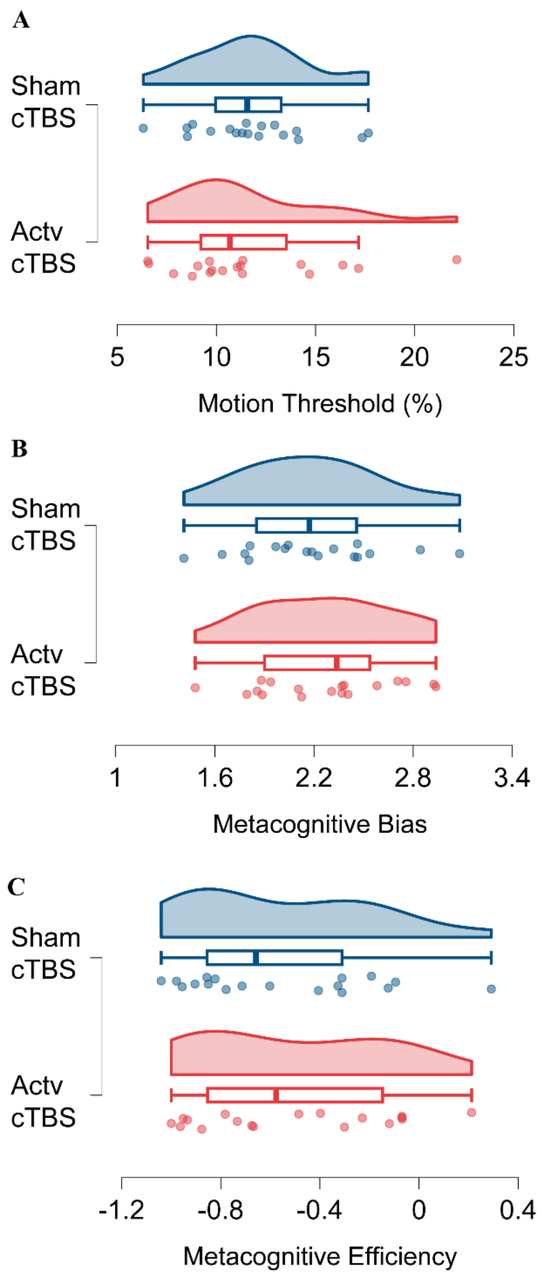

Figure S 1 Comparison of baseline performance between experimental groups. Raincloud plots visualize the pre-stimulation baseline values for the Sham cTBS (blue) and Active cTBS (red) groups across the investigated metrics: Motion Threshold (**A**), Metacognitive Bias (**B**), and Metacognitive Efficiency (**C**). Each panel combines a half-violin plot showing the probability density distribution, a boxplot indicating the median and interquartile range, and jittered scatter points representing individual participant data. Bayesian analysis confirmed that baseline performance was comparable between the two groups for all metrics, providing evidence in favour of the equality of the means ($4.90<BF_{01}<5.89$).

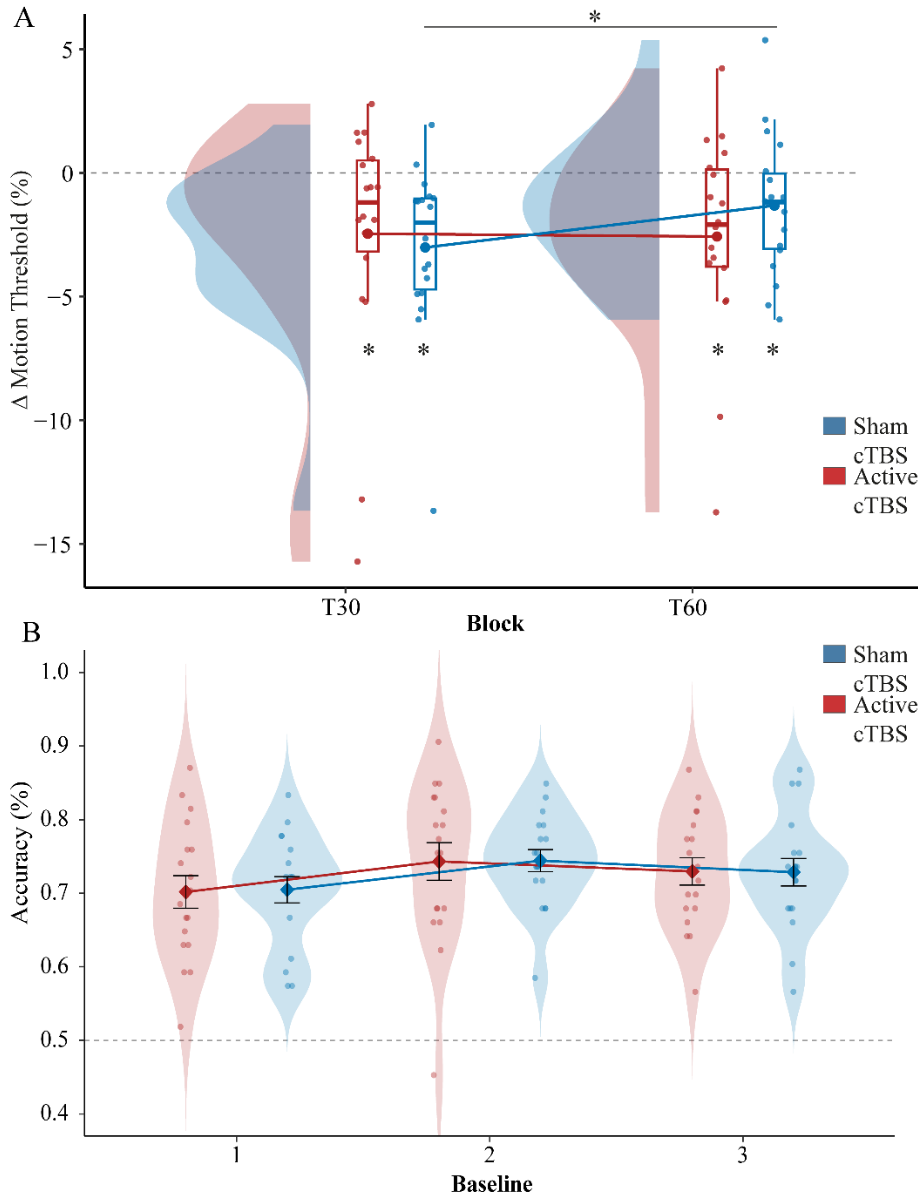

Figure S 2 **(A) Changes in motion sensitivity** threshold (75% accuracy) following ccPAS and cTBS. Half-density and Box-plots with individual data points represent raw, mean and median of delta perceptual threshold at T30 and T60 for active (red) and sham (blue) condition of cTBS; Asterisks show significant effects ($p<0.05$). **(B) Pre-intervention baseline performance.** Performance evolution across three blocks of trials administered before the ccPAS intervention. The plot shows comparable baseline characteristics between the independent Active (red) and Sham (blue) groups ($p=.16$). Data show means ± [SEM], overlaid with individual data points and density distribution. The dashed line indicates chance performance (0.5).

Supplementary analysis

To provide a raw estimate of trial-by-trial metacognitive efficiency - defined as the degree to which confidence ratings accurately track objective performance - we expanded the model to include Response Accuracy. We replicated the significant three-way interaction cTBS*Block*Coherence ($\chi^2(2) = 13.20$, $p = .001$), confirming the specific trajectory of metacognitive bias following the stimulations even after accounting for trial-by-trial accuracy.

This was supported by the non-significant interactions of cTBS*Block*Accuracy ($\chi^2(2) = 1.69$, $p = .43$) and cTBS*Block*Accuracy*Coherence ($\chi^2(2) = 2.53$, $p = .28$). The model also revealed a robust relationship between metacognitive bias and objective performance, evidenced by a significant main effect of accuracy ($\chi^2(1) = 496.56$, $p < .001$) indicating higher bias levels for correct responses. We also observed significant interactions of Block*Accuracy ($\chi^2(2) = 21.22$, $p < .001$), Coherence*Accuracy ($\chi^2(1) = 488.50$, $p < .001$) and Block*Accuracy*Coherence ($\chi^2(2) = 31.43$, $p < .001$). Post-hoc decomposition of the latter interaction revealed that at low coherence (high noise), metacognitive bias rose significantly from baseline (BSL) to subsequent sessions (T30 and T60) regardless of the response accuracy (all $p < .001$). In contrast, at high coherence (low noise), the system displayed a more nuanced shift in metacognitive efficiency over time. Between baseline and T30, confidence for correct responses significantly increased ($B = -0.38$, $p = .020$), while confidence for errors simultaneously decreased ($B = 0.55$, $p = .034$). This divergent pattern suggests that while sensory facilitation from ccPAS leads to a generalized increase in bias at peri-threshold conditions, it may collaterally facilitate a genuine refinement of metacognitive efficiency - selectively boosting certainty for hits while reducing it for misses - when the perceptual signal is clearer.